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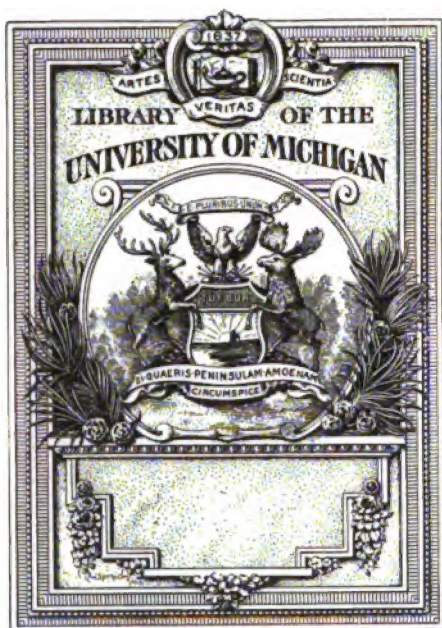
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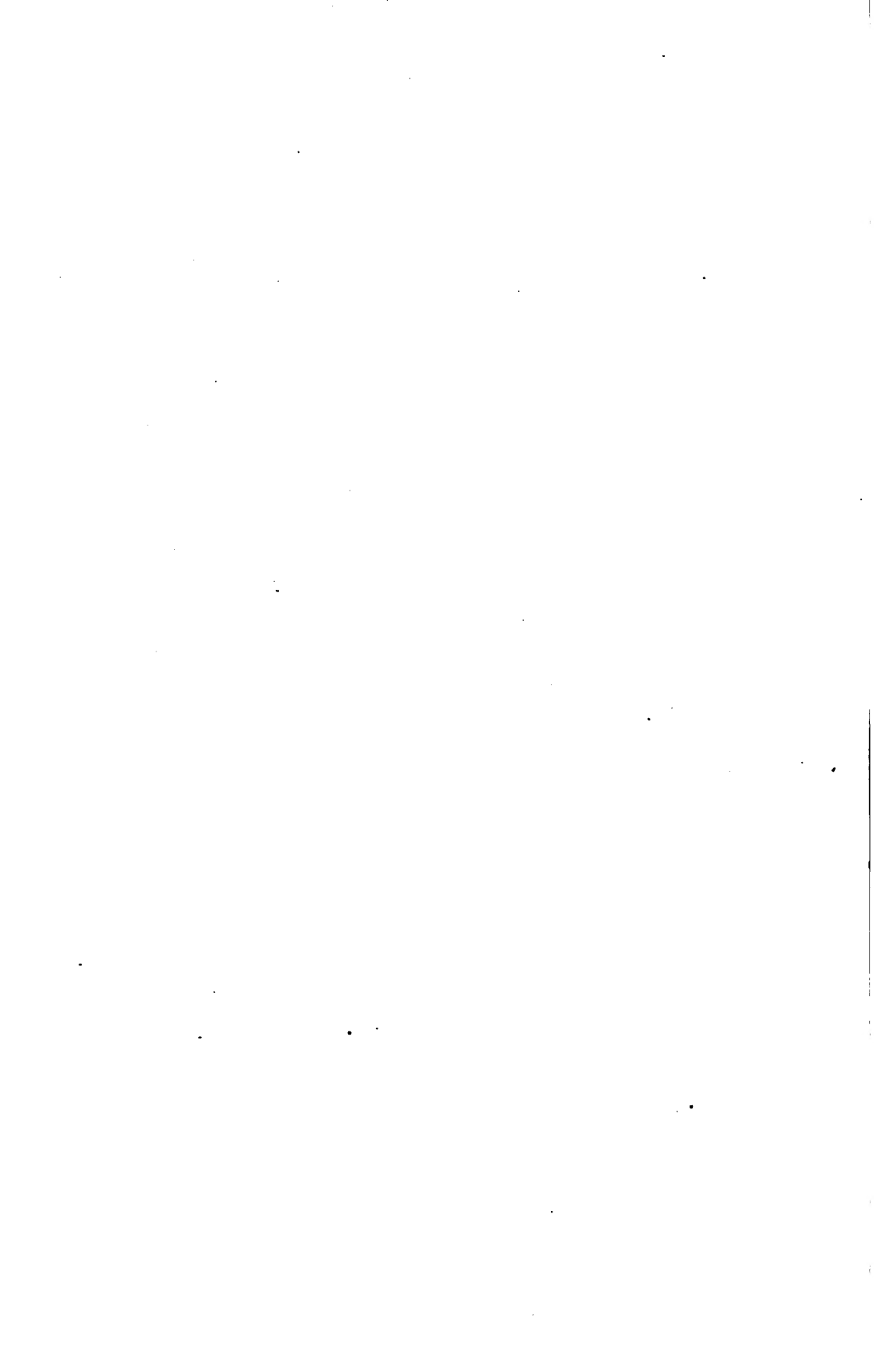
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ANNUAL REPORT
OF THE
Colorado State Horticultural
AND
Forestry Association,
FOR THE
YEAR 1889.
VOLUME V.

DR. ALEXANDER SHAW, SECRETARY.

DENVER:
COLLIER & CLEVELAND LITHOGRAPHING CO., STATE PRINTERS.
1890.

LETTER OF TRANSMITTAL TO THE SECRETARY
OF STATE.

DENVER, COLORADO, May 24, 1889.

HON. JAMES RICE,

Secretary of State:

Sir—In compliance with the law, I have the honor of submitting herewith the annual report of the Colorado State Horticultural and Forestry Association, with supplementary papers for 1889.

Respectfully yours,

ALEXANDER SHAW,

Secretary.

Filed in the office of the Secretary of State, of the State of Colorado on the 24th day of May, A. D. 1889, at 3:30 o'clock p. m.

Recorded in book-----, page-----.

JAMES RICE,
Secretary of State.

OFFICERS FOR 1889.

PRESIDENT,

C. S. FAUROT, Boulder.

VICE-PRESIDENT AT LARGE,

W. B. FELTON, Cañon City.

SECRETARY,

DR. ALEX. SHAW, Denver.

TREASURER,

WILLIAM DAVIS, Denver.

EXECUTIVE COMMITTEE,

LEVI BOOTH, Denver,

DAVID BROTHERS, Denver.

JOHN TOBIAS, Denver.

COUNTY VICE-PRESIDENTS,

ARAPAHOE. S. R. PRATT Denver.

ARCHULATA ----- Alamosa.

BACA . . . ----- Springfield.

BENT . . ROBT. McLAIN Catlin.

BOULDER. . HIRAM PRINCE. Canfield.

CHAFFEE . ALEX. G. WATSON. . Buena Vista.

CHEYENNE. ----- Cheyenne Wells.

CLEAR CR'K R. M. OLDS. Georgetown.

CONEJOS . . REV. PAUL ANDERSON La Jarar.

COSTILLA . COL. CHAS. JEHU. . . -----

CUSTER . . E. T. BECKWITH . . . West Cliff.

DELTA. . . HON. SAMUEL WADE. Paonia.

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|-------------|-------------------------------------|
| DOLORES. | |
| DOUGLAS. | HON. L. W. WELLS . . . Castle Rock. |
| EAGLE. | |
| ELBERT. | J. A. MAUDLIN . . . Elizabeth. |
| EL PASO. | WILLIAM BUSH . . . Colorado Spr'gs. |
| FREMONT. | DR. T. H. CRAVEN . . . Cañon City. |
| GARFIELD. | J. C. KENNEDY . . . Glenwood Sp'gs. |
| GILPIN. | D. B. NEWEL . . . Central. |
| GRAND. | ..... |
| GUNNISON. | ALEX. GULIETT . . . Gunnison. |
| HINSDALE. | ..... |
| HUERFANO. | JUAN MARTIN . . . Walsenburg. |
| JEFFERSON. | HENRY LEE . . . Denver. |
| KIT CARSON. | ..... |
| KIOWA. | ..... |
| LAKE. | HON. J. J. STOTSENBERRY . Leadville |
| LA PLATA. | J. P. HARPER . . . Durango. |
| LARIMER. | N. A. HOAGE . . . Fort Collins. |
| LAS ANIMAS. | S. W. DE BUSK . . . Trinidad. |
| LINCOLN. | ..... |
| LOGAN. | M. C. KING . . . Sterling. |
| MESA. | C. W. STEEL . . . Grand Junction. |
| MONTROSE. | A. D. FAIRBANKS. . . Montrose. |
| MONTUZUMA. | MR. HANNA . . . Cortez. |
| MORGAN. | L. W. KIMBAL. . . Fort Morgan. |
| OTERO. | ..... |
| OURAY. | MR. A. CUTTER. . . Ouray. |
| PARK. | HON. W. BALLINGER . Como. |
| PITKIN. | J. W. CHATFIELD. . . Aspen. |
| PHILLIPS. | ..... |
| PROWERS. | — COOPER. . . Lamar. |
| PUEBLO. | A. C. HAYDEN . . . Pueblo. |
| RIO BLANCO. | ..... |
| RIOGRANDE. | C. NESBIT. . . Del Norte. |
| ROUTT. | E. BENNETT . . . Steamboat Rock |
| SAGUACHE. | J. W. TAYLOR . . . Saguache. |

STANDING COMMITTEES.

7

SAN JUAN
SAN MIGUEL
SEDGWICK Julesburg.
SUMMIT
YUMA
WASH'GTON MRS. H. B. MERRELL, Akron.
WELD . . . RALPH HILTON . . . Greeley.

STANDING COMMITTEES, 1889.

BOTANY AND ENTOMOLOGY.

PROF. JAMES CASSIDY . . Fort Collins.

ORNAMENTAL GARDENING.

JOHN BERRY Denver.

VEGETABLE CULTURE.

W. W. WILMORE Denver.
W. L. PORTER Greeley.
J. S. IBBISON Denver.

POMOLOGY.

JAMES ACKERMAN . . . Hygiene.
DALL DEWEESE Cañon City.
HON. SAMUEL WADE . . . Paonia.

FORESTRY.

COL. EDGAR T. ENSIGN . Colorado Springs.
D. S. GRIMES Denver.

GEOLOGY.

PROF. LAKE Golden.

IRRIGATION.

PROF. L. G. CARPENTER . Fort Collins.

ELWOOD EASLY Golden.

ORNITHOLOGY.

A. T. ALLEN Denver.

ANNUAL MEMBERS, 1889.

| | |
|-------------------------------|--------------|
| James Ackerman | Hygiene |
| Levi Booth | Denver |
| Mrs. M. A. Booth | Denver |
| Elwood Easley | Golden |
| Mrs. D. M. Easley | Golden |
| J. S. Ibbison | Denver |
| Mrs. J. S. Ibbison | Denver |
| J. S. McClelland | Fort Collins |
| Mrs. H. P. Merrill | Denver |
| S. R. Pratt | Denver |
| E. Milleson | Denver |
| M. Milleson | Denver |
| L. J. Milleson | Denver |
| A. E. Gipson | Greeley |
| E. J. Hubbard | Elmore |
| S. A. Osborn | Denver |
| David Brothers | Denver |
| Mrs. David Brothers | Denver |
| T. H. Kellogg | Denver |
| C. S. Faurot | Boulder |
| Geo. B. Bowman | Pueblo |
| Jacob Haver | Pueblo |
| John Tobias | Denver |
| Allen Lewis | Denver |

LIFE MEMBERS.

9

| | |
|------------------------------|------------------|
| W. W. Wilmore | Denver |
| C. L. Hughes | Denver |
| W. E. Pabor | Denver |
| E. P. Horn | Argo |
| J. W. Rose | Denver |
| W. B. Fitton | Cañon City |
| S. Allen Long | Denver |
| Mrs. S. Allen Long | Denver |
| D. S. Harris | Burlington |
| J. H. Brammeur | Burlington |
| G. H. Parsons | Colorado Springs |
| J. L. Peabody | Denver |
| Rev. Paul Anderson | La Jara |
| Mr. Wardsworth | Denver |

LIFE MEMBERS.

| NAME. | POST-OFFICE ADDRESS |
|------------------------------|--------------------------------|
| Berry, John | Denver |
| Ball, J. J. T | Denver |
| Brown, H. C. | Denver |
| Bird, F. E | Denver |
| Braun, G. J | Denver |
| Crawford, R. T. | Colorado Springs |
| Corning, Geo. C. | Denver |
| City National Bank | Denver |
| Craig, Rev. W. B. | Denver |
| Craig, Mrs. W. B. | Denver |
| Clark, J. M. | Denver |
| DeVinney, V | Jefferson County, P. O. Denver |
| Davis, William | Denver |
| Ellsworth, L. C. | Denver |
| Frazier, Jesse | Florence, Fremont County |
| Grimes, David S. | Denver |
| Gallup, Avery. | Denver |

| NAME. | POST-OFFICE ADDRESS |
|---------------------------------|--------------------------------|
| Gallup, C. R | Denver |
| Hanna, J. R | Denver |
| Hallack, Mrs. Charles | Denver |
| James, Robert. | Denver |
| Kountz, C. B | Denver |
| Laue, John H. | Denver |
| Lee, Henry | Jefferson County, P. O. Denver |
| Lessig, W. H. | Denver |
| Londoner, Wolfe | Denver |
| Lower, John P | Denver |
| McClure, Mrs. Kate. B | Denver |
| Moore, Rev. D. H. | Denver |
| Marquis, Robert. | Denver |
| Moulton, Thomas | Denver |
| Newcomb, J. H. | Denver |
| Newcomb, Mrs. J. H. | Denver |
| Peabody, A. L | Grand Junction, Mesa County |
| Peabody, Mrs. A. L. | Grand Junction, Mesa County |
| Pitkin, Ex-Gov. F. W. | Pueblo |
| Pierce, Gen. John | Denver |
| Rushmore, H. | Denver |
| Richardson, George | Argo |
| Shaw, Dr. Alex. | Denver |
| Short, Prof. S. H | Denver |
| Van Camp, J. M. | Denver |
| Wolf, H. G. | Denver |
| Wolf, Mrs. H. G. | Denver |
| Wood, S. N. | Denver |
| Wolcott, E. O. | Denver |
| Wade, Samuel. | Paonia |
| Dana, F. A. | Denver |
| Dall, Dewese | Cañon City |

HONORARY MEMBER.

Bracket, G. C., Sec. Kansas State Horticultural Society.

CONSTITUTION
OF
Colorado State Horticultural
AND
FORESTRY ASSOCIATION,
AS AMENDED AT ANNUAL MEETING,
JANUARY 13, 1888.

SECTION 1. This association shall be called the COLORADO STATE HORTICULTURAL AND FORESTRY ASSOCIATION, and shall have for its object the promotion of horticulture, pomology, arboriculture and floriculture.

SEC. 2. This association shall hold its regular annual session, beginning on the the second Thursday in January of each year, at 10 o'clock a. m., at such place as the President may designate, for the purpose of electing its officers, and the transaction of such other business as may be necessary, and it shall also hold such other meetings as the interests of the Association may demand, at such time and place as the Executive Committee may designate, and seven members shall constitute a quorum for the transaction of business.

SEC. 3. The officers of the Association shall consist of a President, a Vice-President at large, a Secretary and Treasurer, who shall be elected by ballot, and a majority

of the votes cast shall be necessary to an election ; also, a Vice-President from each of the counties of the State interested in the promotion of the objects of the Association, who may be elected by the Association at its annual meeting, or by the Executive Committee.

Sec. 4. The President of any District or County Horticultural Society, of this State, shall be *ex officio* Vice-President of this Association, and shall have all the rights and privileges of regular members.

SEC. 5. The President, Vice-President at large, Secretary, Treasurer and three other members, to be elected at the annual meeting, shall constitute an Executive Committee, charged with the general supervision of all matters of interest to the Association during the interim of meetings, with power to act in all cases of emergency, and a majority of the committee shall constitute a quorum for the transaction of business.

SEC. 6. The Association shall contract no debts, unless by a two-thirds vote of members present at any regular or called meeting.

SEC. 7. The written acceptance of an officer elected, filed with the Secretary, shall be considered as qualifying.

SEC. 8. The Treasurer shall give bond in such sum as may be fixed and accepted by the Association at any annual meeting.

SEC. 9. The Association shall, in every proper way encourage and assist in the organization of County and District Societies.

SEC. 10. The Association may, at each annual meeting, offer premiums for essays on such subjects as may be determined on, such essays to be read before the next annual meeting, and immediately after reading, the

premiums to be awarded by a majority of the members present.

SEC. 11. Representatives from organizations formed in the interest of horticulture, shall be admitted to all the rights and privileges of members upon certified credentials and without payment of membership fees, upon the following basis: Town Societies, one representative; County Societies, two representatives; District Societies, three representatives.

SEC. 12. The Association may adopt at any meeting such by-laws, rules and regulations as a majority of the members present may determine, not inconsistent with this Constitution.

BY-LAWS.

SECTION 1. The officers of this Association shall hold their respective offices until their successors are elected and qualified.

SEC. 2. The first business of each meeting shall be the reading and approving of the minutes of the previous meeting.

SEC. 3. The payment of one dollar shall constitute an annual membership, which shall cease on the day preceding the first day of the annual meeting in January. Ten dollars paid at any one time shall constitute a life membership.

SEC. 4. The Secretary shall solicit from each Vice President of the several counties, such reports as have immediate connection with the condition of horticulture, pomology, arboriculture and floriculture, and such other information as may pertain to the interest of the

Association, and he shall report the same to the Association. The President shall appoint a standing committee on each of the following subjects, who shall make an annual report at the January meeting: Committees—Meteorology in its relations to Horticulture, Entomology, Ornithology, Geology, Forestry, Pomology, Vegetable Culture, Floriculture and Ornamental Gardening.

SEC. 5. No money shall be drawn from the treasury except upon orders signed by the President and countersigned by the Secretary.

SEC. 6. It shall be the duty of the President to preside at all meetings, sign all orders upon the Treasurer, act as *ex officio* chairman of the executive committee, and sign all approved records; and in his absence the Vice-President at large shall perform his duties.

SEC. 7. It shall be the duty of any one of the County Vice-Presidents present to preside in the absence of the President and Vice-President at large, and to furnish such information as may be solicited by the Secretary.

SEC. 8. It shall be the duty of the Secretary to keep a record of all proceedings of the Association, receive all moneys and pay the same to the Treasurer, and take his receipt therefor; countersign all orders upon the Treasurer, and deliver to his successor in office all books and papers in his possession belonging to the Association; and he shall receive such compensation as may be allowed by the executive committee.

SEC. 9. It shall be the duty of the Treasurer to keep all moneys belonging to the Association, and to pay out the same only upon the order of the executive committee, signed by the President and countersigned

by the Secretary. And he shall make a report of the financial condition of the Association at its annual meeting, and at the expiration of his term of office deliver to his successor in office all moneys in his hands belonging to the Association.

SEC. 10. It shall be the duty of the executive committee to audit all bills, and in the interim of the meetings of the Association, to take such official action as in their judgment may promote the objects of the Association; and report their action to the next succeeding meeting; and they may call a special meeting at any point of the State desired, by giving twenty days' notice.

SEC. 11. The records of this Association shall at all times be open to inspection by any member.

SEC. 12. These by-laws may be altered or amended at any regular meeting, by a vote of a majority of the members present.

COLORADO STATE LAW RELATING TO HORTICULTURE.

AN ACT

TO PROMOTE AND ENCOURAGE HORTICULTURE AND FORESTRY IN THE STATE OF COLORADO, AND TO ESTABLISH A STATE BUREAU OF HORTICULTURE.

Be it enacted by the General Assembly of the State of Colorado:

SECTION 1. That the Colorado State Horticultural Society be and hereby is constituted a Bureau of Horticulture for the purposes hereinafter set forth; *Provided*, That the said Horticultural Society shall accept of and carry out the provisions of this act.

SEC. 2. It shall be the duty of the said Bureau to encourage and assist in the organization of district and county societies, and give them representation in the

State Bureau, and in every proper way encourage and further the fruit and tree growing interests of the State.

SEC. 3. Said Bureau shall hold its annual meetings on the second Thursday in January of each year at the capitol of the State, for the transaction of its business, the election of its officers, and for determining the time and place of holding exhibitions, at which meeting premiums on essays may be awarded, and all questions relating to the horticultural development of the State may be considered.

SEC. 4. The said Bureau shall make an annual report before the first day of June to the Secretary of State, embracing the proceedings of the Bureau for the past year, and statistics showing the general condition of horticulture throughout the State, together with such essays and statements of facts and recommendations as they may deem useful to the horticultural interests of the State; said report to be fully prepared for publication, and the Secretary of State shall cause the same to be published in pamphlet or book form, by the State, under the supervision of the society.

SEC. 5. The number of copies to be published of said report shall be two thousand, all of which shall be bound in a uniform style every two years, in one volume, and shall be distributed by the Secretary of the State, as follows: Ten copies each to the Governor of the State, Secretary of State, State Auditor and State Treasurer, five copies each to the Supreme Judges and Attorney-General, two to each member of the legislature, one copy to each judge and clerk of district and county courts, one copy to each newspaper office in the State, ten copies to the State University, School of Mines, Reform School and Warden of the State Penitentiary, two copies to each college of learning in the State, fifty copies to the Agricultural College, and two copies to the State Historical Society, and the remainder to the State Horticultural Bureau, to be distributed as said Bureau may direct.

SEC. 6. To enable the said Bureau to carry out the provisions of this act, the sum of one thousand dollars is hereby appropriated annually out of any moneys not otherwise appropriated.

SEC. 7. If the said Horticultural Society shall accept of the provisions of this act, they shall certify their acceptance of the same to the Secretary of State and the State Auditor. After said acceptance the State Auditor shall annually on the first of June, on the order of said society, signed by the president and secretary of said society, draw a warrant on the State Treasurer for the aforesaid sum of one thousand dollars: *Provided*, Should the said Horticultural Bureau fail to carry out the provisions of this act, during any one year after the first day of April, A. D. 1883, then, and in that event, the aforesaid warrant shall not be drawn for that year.

Approved March 8, 1883.

Supreme Court's construction of the law as indicated by following decision:

Extract from *Pacific Reporter*, volume IX, page 628.

PEOPLE EX-REL. Richardson vs. Spruance.

Filed January 8, 1886.

*State Horticultural Society—Funds for its support—
How to be appropriated.*

To authorize the State Auditor, consistently with section 32, of article 5, of the Constitution of Colorado, to draw a warrant upon the State treasury for the use of the State Horticultural Society, there must be a specific appropriation by separate bill made by the legislature.

Mandamus.

S. A. Osborne, for plaintiff.

T. H. Thomas, Attorney-General, for respondent.

STONE, J.—The petitioner, as "President of the Colorado State Horticultural Society and Bureau of Horticulture," seeks to compel the respondent, as State Auditor, to draw a warrant upon the State Treasurer for the sum of \$1,000, for the use of the said Horticultural Society. The authority upon which the petitioner pre-

18 SUPREME COURT'S CONSTRUCTION OF THE LAW.

dicates the duty of the Auditor to act in the premises is based upon the act of March 8, 1883 (Sess. Laws, 1883, p. 210), entitled, "An act to promote and encourage horticulture and forestry in the State of Colorado, and to establish a bureau of horticulture."

The first section of the act declares "that the Colorado State Horticultural Society be and is hereby constituted a bureau of horticulture for the purposes hereinafter set forth, provided that the said horticultural society shall accept of and carry out the provisions of this act."

The act then proceeds to set forth the general purposes of the society, or bureau, its duties, the time and place of its meetings for the transaction of business, the election of officers, etc. It requires that reports of the proceedings of the society shall be made, prescribes what the reports shall contain, and that a specified number of copies of such reports shall be published and distributed to the various offices and departments of the State, and certain designated institutions, societies and persons.

The sixth and seventh concluding sections of the act are these :

"SEC. 6. To enable the said bureau to carry out the provisions of this act the sum of one thousand dollars is hereby appropriated annually out of any moneys not otherwise appropriated.

"SEC. 7. If the said Horticultural Society shall accept of the provisions of this act, they shall certify their acceptance of the same to the Secretary of State and State Auditor. After said acceptance, the State Auditor shall annually, on the first of June, on the order of said society, signed by the president and secretary of said society, draw a warrant on the State Treasurer for the aforesaid sum of one thousand dollars; *Provided*, Should the said horticultural bureau fail to carry out the provisions of this act during any one year after the first day of April, 1883, then, and in that event, the aforesaid warrant shall not be drawn for that year."

The petition avers an acceptance of and compliance with all the provisions of said act, alleges a proper demand and order upon the Auditor for the issuance of a warrant for the said sum of \$1,000, and a refusal by the Auditor so to do.

In support of his demurrer to the petition the Attorney General contends:

First—That the Society is not of that character which will authorize an appropriation of the moneys of the State in its support, in that it is not shown to be a society or institution "under the absolute control of the State."

Second—That bills for the expenses incurred by the Society, and to be defrayed by the sum demanded, have not been presented to the Auditor for auditing and allowance.

Third—That no specific appropriation has been made by the legislature for this purpose. Upon this point we are cited to section 34 of act 5, of the State Constitution which forbids appropriations for "charitable, industrial, educational or benevolent purposes, to any person, corporation, or community not under the absolute control of the State;" and we are referred to the annual reports of this society, by stipulation filed with the briefs of counsel, to show that said society elects its own officers, transacts its business through them, and its own agents and employés, and for its own benefit, or for the benefit of a particular class, without the immediate and absolute control and direction of the State.

The act of March, 1883, relating to this society, constitutes it a "Bureau of Horticulture," a "State Bureau," and subjects it to certain requirements so as to clearly indicate an intention to make it a bureau or institution of the State, for the obvious benefit to be derived by the State therefrom. By said act, and its acceptance as aforesaid, it is brought under the control of the State, so far as the legislature has chosen to enact, and if not under its "absolute" control in respect to the choice of officers and the detail of proceedings within the scope of its purposes, it certainly *may* be subjected to such

absolute control whenever the legislature so chooses. The said society is therefore, in our opinion, not within the constitutional inhibition referred to, and is constitutionally capable of receiving the benefits of such appropriations. We find nothing in the published reports of the society, submitted for our inspection, inconsistent with the legitimate purposes of the organization, the legislation relating thereto, or opposed to the views above expressed.

The petition avers, and the printed reports show, that said reports, covering the transactions of the society for the years 1882, 1883, 1884 and 1885, were accepted by the Secretary of State, and by that officer published in pursuance of the act, of the General Assembly in question.

Upon the second point of objection the demurrant contends that expenses incurred on behalf of the society are embraced within the provisions of section one of the act of March 25, 1885, which, *inter alia* declares that "all bills for expenses of every kind or nature whatsoever, incurred by or on account of the State, or any department thereof, shall be presented to the State Auditor, and, if found correct, shall by said Auditor be audited and allowed." We do not think this provision of the statute is intended to apply to other matters than those embraced within the proper meaning of the language employed, to-wit, "the State, or any department thereof;" and it cannot well be claimed that this society is in any such sense as is here meant, a department of the State. Besides, the act authorizing the appropriation in question seems to contemplate that the specific sum of \$1,000 in gross is to be paid to the use of the society annually, upon the condition only, as set forth in the first and last sections of the act, that the society accept the provisions of the act, and fully comply with all of the stated requirements thereof. The matter of incurring expenses by the society, of adjusting, settling, approving and allowing the same, appear to be left to the proper officers of the society, and the sum of \$1,000 annually is to be paid by the State Treasurer upon a warrant drawn by the State Auditor upon the order of the society, signed by the president and secretary thereof, and the duty of the

Auditor is not made to extend beyond seeing that the due acceptance of the provisions of the act by the society is certified to him, and to the Secretary of State, and thereupon to draw his warrant for the sum specified in the act to be paid annually. At all events, the legislature has required this, and no more, and we cannot judicially extend it to embrace what is not expressed or clearly implied.

The third point of objection, that there has been no appropriation for the purpose, we think is well founded. By reference to the acts of the general assembly it will be seen that no sum for this purpose is included in the general appropriation bills under any head therein, nor could it be so included without violating section thirty-two of article five of the constitution, which provides that "the general appropriation bill shall embrace nothing but appropriations for the ordinary expenses of the executive, legislative and judicial departments of the State, interest on the public debt, and for public schools. All other appropriations shall be made by separate special bills, each embracing but one subject. And the section immediately following declares that no money shall be paid out of the treasury except upon appropriations made by law. * * *."

No separate bill for the support of this society has been passed, or specific appropriation therefor made, and the petition fails, therefore, to show that the Auditor has any authority to draw the warrant in question.

The act of 1883 creating the Bureau, and appropriating \$1,000 annually therefor, does not operate in itself to make an appropriation such as is required by the provisions of the Constitution above quoted. It does not effect a perpetual appropriation annually of the sum named without other act of the legislature. In effect, its proper meaning is merely that "to enable," etc., there shall be appropriated by the General Assembly at each session thereof an annual sum of \$1,000, "out of any moneys," etc. In short, it is but the *granting authority* for such appropriation. But the specific appropriation itself, or setting apart from the general fund of the State treasury by a separate bill for that purpose, which shall

be clearly expressed in the title, must be made by each successive legislative assembly, the same as is required and done for every department and institution of the State, except those designed to be included in the general appropriation bill, and those, perhaps, for the support of which a special fund is provided by an annual State tax levied for the particular purpose.

The omission to make the specific appropriation to this society, as is authorized by the act of 1883, was doubtless an oversight on the part of the General Assembly of 1885, or the result of a misconception of the effect of section 6 of said act, such omission necessitating future action by the legislature in that behalf.

Since the petition fails to show that a specific appropriation by separate bill, as the Constitution requires, has been made of such sum for the purpose, it follows that no legal duty is shown to exist on the part of the respondent Auditor to do and perform what is prayed to be enforced by the mandate sought, and hence no sufficient cause for the issuance of the writ being shown by the petitioner, the demurrer is sustained."

EXECUTIVE COMMITTEE MEETINGS.

DENVER, January 17, 1888.

At a called meeting of executive committee, Wm. Davis, A. S. Osborn, A. E. Gipson and A. Shaw were present; President Gipson in the chair.

On motion, \$15.00 was appropriated for contingent expenses of secretary's office.

The Secretary was directed to establish his office at the rooms of the Denver Real Estate Exchange, provided room can be obtained free of rent; he was also directed to collect the books, reports and property of the

association and keep them at headquarters, wherever established.

Adjourned.

ALEX. SHAW,
Secretary.

DENVER, May 15, 1888.

Executive committee met for purpose of revising Secretary's manuscript of annual report to Secretary of State. Present, David Brothers, E. Milleson, Wm. Davis and A. Shaw.

Report revised and ordered filed with Secretary of State. The Secretary exhibited a proof of an engraving of Martin E. Everet, deceased. The members present contributed the sum of \$5.00 to pay for engraving and ordered it published in annual report of 1888.

Adjourned.

ALEX. SHAW,
Secretary.

DENVER, December 3, 1888.

Executive committee met to consider programme of annual meeting for 1889. Programme read and adopted as follows:

Programme.

FIRST DAY—10 O'CLOCK A. M.

Meeting called to order; Secretary's report; Treasurer's report; President's annual address.

2 O'CLOCK P. M.

Reports of standing committees.

1. *Botany and Entomology*—Professor Cassidy of Agricultural College, chairman.
2. *Floriculture*—By John Davis, florist, of Denver.
3. *Pomology*—By G. W. Felton of Cañon City.

4. *Forestry*—By Colonel Edgar T. Ensign, State Forestry Commissioner.

5. *Vegetable Culture*—John Tobias of Jefferson county, chairman.

6. *Geology*—Professor Lake of the State School of Mines, chairman.

7. *Irrigation*—Professor Mead of Cheyenne, Wyoming, chairman.

8. *Ornithology*—By A. T. Allen, taxidermist, of Denver.

7:30 O'CLOCK P. M.

Essay—By Mr. James Ackerman, Boulder county.

Essay—An Object Lesson, Fruits on Exhibition, by Dr. Alexander Shaw.

Discussion on Apples of Colorado.

SECOND DAY.

Essay—Culture of Roses, by Mrs. Bain, florist, of Pueblo.

Essay—Two Summers' Experience in a Garden, by Mrs. Washburn, of Loveland.

Essay—A Few Bugs, by J. S. McClelland, of Fort Collins.

Election of officers for 1889.

Essay—Topics on Chemistry Germain to Horticulture, by Professor O'Brien, of the Agricultural College.

Essay—History of Horticulture in Big Thompson Valley, by Mrs. Taylor.

Essay—Growth, Culture and Sale of Nursery Stock, by Dall Dewees, of Cañon City.

Essay—Culture and Management of Timber Claims, by E. Milleson, of Denver.

Evening, 7:30, devoted to impromptu speeches, music, vocal and instrumental.

Special programme timely announced in city papers.

THIRD DAY—9 O'CLOCK A. M.

Culture of Root Crops and Uses Best Adapted—Professor A. E. Blount, Agricultural College.

Needs of Legislation in the Interests of Horticulture—C. S. Faurot, of Boulder.

Experimental Stations—President Ingersoll, of the Agricultural College.

Conservation of Water for Irrigating Purposes—T. C. Henry, of Denver.

Irrigation and Construction of Ditches—Walter Graves, civil engineer, of Monte Vista.

Commercial Aspect of Fruit Market of Denver, with Directions how to Store and Handle Fruit to make the most Profitable Results, together with a Tabulated Statement of Fruit Sold in Denver Markets in 1888—J. T. Cornforth, dealer in fruits, Denver.

Floriculture—Miss Lerah Straton, graduate of State Agricultural College.

Adaptation of Southern Colorado to Fruit Culture—S. W. Debusk, of Trinidad.

Fruit Culture in the Grand Valley—E. W. Steel, of Grand Junction.

Fruit Culture in the Gunnison Valley and Tributaries—Hon. S. Wade, of Paonia.

Bee Culture and Honey Statistics—J. M. Clark, Denver, Secretary State Bee Keepers' Association.

Needs of Legislation on the Forestry Interests of Colorado—Colonel Edgar T. Ensign, of Colorado Springs.

Unfinished business.

A. E. GIPSON,
President.

ALEX. SHAW,
Secretary.

DENVER, January 5, 1889.

Executive committee meet. Present, Wm. Davis, A. S. Osborn, E. Millison and A. Shaw.

The Secretary was directed to employ Miss Grace Patton, of the State Agricultural College, at a salary of \$5.00 per day, hotel bill and railroad fare, to report the proceedings of annual meeting, January 10, 11 and 12, 1889. Secretary stated terms made with the Denver Real Estate Exchange as to financial liabilities of Annual Meeting and Fruit Exhibit to be as follows: All incidental expenses, including rent of hall, to be borne by Denver Real Estate Exchange, whereupon Secretary was directed to consummate the arrangement.

Adjourned.

ALEX. SHAW,
Secretary.

PROCEEDINGS
OF THE
State Horticultural and Forestry
ASSOCIATION,
HELD IN
DENVER, COLORADO.

JANUARY 10, 1889.

At the annual meeting of the State Horticultural and Forestry Association held at Denver, Colorado, January 10, 11 and 12, 1889, the following proceedings were had:

January. 10, 1889, 10 a. m.

The meeting was called to order by the President, A. E. Gipson. Mr. J. S. McClelland moved that the reading of the minutes of the last annual meeting be dispensed with, and that they stand approved as published. The motion being duly seconded, prevailed.

The report of the Secretary was called for. The Secretary, Dr. Alexander Shaw, stated that his report was prepared, but that he had been so busily engaged preparing the exhibit that he was not in a condition to present it at this time.

On motion of Dr. Shaw, the meeting adjourned until 2 o'clock p. m.

January 10, 1889, 2 p. m.

The Association met pursuant to adjournment.

The Secretary, Dr. Shaw, presented his report, which was as follows :

SECRETARY'S REPORT.

So far as the transactions of the Association for the year 1888 are concerned, there is but little to report, there having been no meeting of the Association since the last annual meeting. The Executive Committee have had three meetings for advisement. The want of financial means has materially crippled the Association and prevented the Executive Committee from formulating any special work.

I have been left to rustle as best I could to keep some life in the State's orphan, hoping that the future will give us a share of the State's patrimony, by which we can keep our Association from filling a pauper's grave.

Through the courtesy of Mr. Secretary Dana, of the Real Estate Exchange, we have been given a home during the summer months, and at present are comfortably housed by the permission of the commissioners of Arapahoe county. Having a house at command, I set about getting our effects together, and have kept house as best I could.

The law passed for our benefit in 1882 has been judicially adjudged to be sufficiently valid, to authorize the Secretary of State to have our annual reports published in pamphlet and book form. Accordingly there were published under Secretary Clark's administration two volumes of an edition of two thousand copies each. Secretary Millett published one volume of two thousand

copies. I found in store about three thousand copies, the most of which I have distributed among the citizens of the State, and exchanges of other States and kindred societies.

The edition published under my direction is a book of 680 pages, and an edition of two thousand copies under our law, about 600 copies are assigned to the Secretary of State for distribution, and the residue to our Association. We have on hand about 500 copies yet for distribution. The only sources of income are from the receipts of annual and life memberships.

To meet outlays of incidental expenses I have done some rustling among friends, a detailed statement of which will accompany this report with an itemized statement of my disbursements.

The Chairmen of our standing committees have intimated to me that a report on their specialties will be forthcoming; for details I refer you to their reports.

My own personal observation leads me to conclude that horticulture in Colorado is on the up-grade, and so far as tree fruits are concerned, Colorado is rapidly coming to the front, and at the risk of being called a crank, will take no back seat. This year, as to small fruits, there have not been as great crops as last, in some localities. Notable among which was the neighborhood of Cañon City.

The grape crop was short in most parts of the State except the Gunnison Valley and extreme South.

Strawberries, as a rule, one-half crop.

Blackberries and raspberries, where covered, were ordinarily good.

Currants and gooseberries, fair.

This year of abundant tree fruits is peculiarly the horticulturist's year.

I know of no locality in the State where trees have been properly cared for, of proper age, that has failed to produce remunerative crops. This has been an especial year for apples, and fair for pears on trees of sufficient age.

A conservative estimate of the State's apple crop for 1888 is about 60,000 bushels. The apple is a success from the extreme Northern to the Southern line of the State. The climate and soil of Colorado, where water for irrigation is at command, bids fair to be as good as any other State in the United States. About 200 varieties have been successfully fruited, and there is as good reason for growing any favorite kinds in Colorado as elsewhere, under proper care and culture. The meteorological records show a more equitable temperature in Colorado than states east of us, less extremes of heat and cold. We are on the direct mean line of temperature of the North American continent. It is yet somewhat problematical whether some of the early blooming fruits will be a general success among the stone fruits, such as cherries and some varieties of plums. Most of the cultivated varieties of wild origin are a general success.

Strawberries, currants, blackberries and raspberries are a success at all points of the State.

Through the courtesy of the signal station officers of Denver and the full and complete records kept at the State Agricultural College, I am enabled to file as an addendum to this report, a tabulated statement of meteorological observations, which will be of interest to all of an enquiring mind.

The question of insect pests is a question of interest, and seems to be of growing importance. Among the most noted is the codlin moth.

This insect question will doubtless secure special attention by our standing committee on entomology.

The interest in horticultural organizations as auxiliary to our State organization is on the increase.

I am advised of the doings of the Northern District Horticultural Society, as will be seen by the manuscript furnished in my report recently published. This society materializes more than any other point in the State for our annual reports, in the way of readable manuscript for publication.

I am advised of the organization of the Pueblo District Horticultural Society; also the Fremont County Society, and Delta County Society. There are other societies organized, of which I have not been officially notified.

Vegetable culture is pre-eminently a success at all points in the State.

Root crops in many of our mountain valleys make a phenomenal growth, especially potatoes.

There are no means at command by which an approximate estimate can be made, but a recent personal visit revealed to me that the shipment of the combined dealers in Greeley will be for the current year 30,000,000 pounds, requiring 1,500 cars for transportation, making an aggregate valuation of about \$200,000.

I acknowledge my obligation to railroad and express authorities for free transportation in making personal visits to most of the orchards in the State.

We are largely indebted to this source for the collection of fruits now on our tables.

Success by demonstration leaves no room for doubts.

The exhibit before us is an object lesson, and an instructive topic for a practical discussion as to Colorado's fitness for orchard culture, with an orchard area of 600 miles from North to South.

Accompanying this report is an unaudited bill for printing letter heads and envelopes, amounting to \$5.75. Also, a detailed statement of the incidental expense account of the Secretary's office, and receipts by Secretary as follows:

Accompanying this report will be a recorded invoice of our library and all other effects belonging to the Association. We have been favored during the past year with bulletins and reports of many kindred societies.

Incidental expenses, Alexander Shaw, Secretary Colorado State Horticultural and Forestry Association:

RECEIPTS.

| | |
|---|-----------------|
| Oct. 1, 1887, from ex-Secretary Millett | \$ 6 37 |
| Jan. 1, 1888, from annual members as follows: | |
| A. E. Gipson | 1 00 |
| Elwood Easley | 1 00 |
| Mrs. David Brothers. | 1 00 |
| David Brothers. | 1 00 |
| E. T. Ensign | 1 00 |
| S. R. Pratt | 1 00 |
| Mrs. French | 50 |
| T. A. Prin | 1 00 |
| Mrs. A. L. Washburn | 1 00 |
| Mrs. Olive Wright | 50 |
| James Iberson | 1 00 |
| James Cassidy | 1 00 |
| Allan Lewis | 1 00 |
| E. Milleson | 1 00 |
| C. F. Glynn | 1 00 |
| F. C. Whitesides | 1 00 |
| Gurley Bros | 1 00 |
| <i>Carried forward</i> | <i>\$ 22 37</i> |

HORTICULTURAL AND FORESTRY ASSOCIATION. 33

Jan. 1, 1888, from annual members as follows:

| | |
|----------------------------------|----------|
| <i>Brought forward</i> | \$ 22 37 |
| John E. Leit | 1 00 |
| John Clough | 1 00 |
| William Farrington | 1 00 |
| C. L. Hughes | 1 00 |
| Mrs. S. Allen Long | 50 |
| A. C. Fisk | 1 00 |
| Dr. Smedley | 1 00 |
| Milo Smith | 1 00 |
| G. B. Hill | 1 00 |
| Jacob M. Murphy | 1 00 |
| D. J. Tiernay | 1 00 |
| A. W. Chamberlain | 1 00 |
| John Mattler | 1 00 |
| E. H. Mason | 1 00 |
| Mrs. R. Tongue | 50 |
| Thomas Tongue | 1 00 |
| Geo. H. Croxton | 1 00 |
| Birks Cornforth | 1 00 |
| W. A. Benedict | 1 00 |
| Mrs. S. E. Parnell | 50 |
| Jacob Gergory | 1 00 |
| G. H. Bushnell | 1 00 |
| J. B. Vroom | 1 00 |
| J. B. Shepherd | 1 00 |
| W. G. Sprague | 1 00 |
| J. T. Green | 1 00 |
| N. O. Vosburg | 1 00 |
| E. G. Perkins | 1 00 |
| J. C. Jones | 1 00 |
| — Miller | 1 00 |
| C. S. Faurot | 1 00 |
| A. C. Harris | 1 00 |
| L. Boyvin | 1 00 |
| S. B. Wright | 1 00 |
| Ralph Hilton | 1 00 |

Total cash received . . \$ 55 87

DISBURSEMENTS.

| | | | |
|-------|-----------|--|--------------|
| Jan. | 13, 1888. | One-half ream writing paper . . . | \$ 3 00 |
| | | Book case | 5 00 |
| | | Table | 2 50 |
| | | Chair | 1 00 |
| | | Shelving for books. | 6 50 |
| Jan. | 14, | Expressman | 1 50 |
| | | Six yards muslin. | 60 |
| Jan. | 19, | Postage stamps. | 25 |
| Jan. | 20, | Duster. | 50 |
| Jan. | 22, | Mucilage and brush | 25 |
| Jan. | 23, | Postage stamps. | 25 |
| Jan. | 31, | Postage stamps. | 25 |
| Feb. | 15, | Postage stamps. | 25 |
| Feb. | 26, | Postage stamps | 50 |
| Feb. | 29, | Ball twine | 20 |
| | | Fifty printed postal cards. . . . | 1 50 |
| March | 6, | Postage stamps. | 50 |
| March | 7, | Wrapping paper | 25 |
| March | 23, | Postage stamps. | 50 |
| March | 28, | Express charges on Michigan reports | 2 25 |
| March | 30, | Postage stamps | 25 |
| April | 6, | Postage stamps | 25 |
| April | 21, | Postage stamps | 50 |
| April | 24, | Postage stamps | 50 |
| May | 3, | Postage stamps | 25 |
| May | 10, | Postage stamps | 25 |
| May | 28, | Bottle ink | 25 |
| June | 25, | Paid janitor at Real Estate Ex- change | 2 00 |
| Sept. | 4, | Paid expressman for moving to court house | 2 00 |
| | | Paid janitor for cleaning room at court house | 3 00 |
| | | Broom. | 30 |
| Sept. | 6, | Postage stamps | 50 |
| | | Wrapping paper | 25 |
| Sept. | 18, | Paid labor one-half day moving. Paper bags | 1 00 3 00 |
| Sept. | 24, | Printing paper bags. | 1 25 |
| Oct. | 10, | Paper bags. | 1 50 |
| Oct. | 15, | Postage stamps | 1 00 |
| Nov. | 20, | Postage stamps | 1 00 |

Carried forward \$46 60

| | | | |
|---------------|--|--|---------|
| | | <i>Brought forward.</i> | \$46 60 |
| Dec. 9, 1888. | | Postage stamps | 1 50 |
| Dec. 9, | | Paid court house janitor, removing books | 2 50 |
| Dec. 15, | | Postage stamps. | 1 50 |
| Dec. 20, | | Postage stamps. | 25 |
| Dec. 24, | | Postal cards | 10 |
| | | Ink and pens | 15 |
| Dec. 26, | | Postage stamps | 25 |
| | | Two hundred envelopes. | 1 00 |
| | | Twine and Wrapping paper. | 20 |
| Dec. 29, | | One hundred and fifty envelopes | 75 |
| Dec. 31, | | Postage stamps | 1 00 |
| | | Total disbursements. | \$55 80 |
| | | Total receipts. | 55 87 |
| | | Due society | \$ 07 |

ALEXANDER SHAW,
Secretary.

On motion duly made and seconded, the report was received, and referred to the Committee on Finance.

The President, A. E. GIPSON, then delivered his annual address, which was as follows :

"Ladies and Gentlemen,—It was the opinion of one of the greatest men of ancient times that the importance of a nation could be judged by the fruit products of the soil ; so this very wise man counseled his people when they went to a new land for the first time, to test the fruits of that land and know something of its pomology. We can commend the opinion of this great law-giver of the Jews in this respect, and we could go further to-day and doubt the sanity of any who would seek to found a nation or a commonwealth without having first investigated the horticulture of the country. In fact, the flowers, trees and fruits have become such a part of our everyday lives that we consider them a necessity. Parker Earl, in a recent address, made the statement that horticulture, at the present time in this country, is doing more to bring about a higher and better civilization than all the manufactories, forges and trade guilds of the country, and I would say that in my judgment,

horticulture is capable of doing more for Colorado than all the smelters of the State and the mineral wealth of the mountains.

“Now, ladies and gentlemen, we have before us a practical demonstration of the possibilities of the development of horticulture, at least in certain directions, in Colorado. Now, there is this about the work in which we are engaged, it is something which we cannot compute from the standpoint of a money value. The wealth of our mines belongs to material matters, while the wealth of horticulture goes beyond that; you cannot estimate it any more than you can estimate the value of the sunshine, of the unseen air which surrounds us. So far as the work of our Society is concerned, it has been from the first, of course, slow but steady; we are improving constantly. I remember very well that not many years ago you could scarcely get an exhibit. We are gaining gradually. It requires a long time to develop the horticultural advantages of any country. The work is necessarily slow, but we are gaining. The special function of this Association should be to enlarge horticulture in every direction. It is said by the founder of a great religion, that, if he had two loaves of bread, he would sell one of them and buy hyacinths, for with them he could feed the soul. This is but another way of stating that we live not by bread alone in this world.

“We have made progress, and very satisfactory progress. Our interest is for the good, and to help the farmers and planters of the State. But we have been very seriously handicapped; we should try to get needed legislation, and we should conduct our Society in such a manner as to make us worthy to demand recognition at the hands of the Legislature. We are doing work which they cannot afford to ignore. Our business is to encourage every department of horticulture. We need especially to carry out these recommendations which have heretofore been made. We must know what is best adapted for general planting, in the way of trees and shrubs and their culture, and we should be sure of our ground that the planters of the State can look to this Society for advice and rely upon its recommendations.

"We must be careful what we recommend and how we recommend, so that our recommendations will stand the test. We ought to make it our business to recommend the horticultural products which are suited to special localities in the State, as well as those of general adaptation, and in doing so, be careful to make the proper distinction.

"Our law-makers should be taught to make appropriate laws for the preservation of our forest trees, and we desire laws enacted for the protection of the State against the attacks of injurious insects. We want to protect the horticultural interests of the State in various directions. When we get the bill drafted that we need, we shall then go before our law-makers and insist upon proper recognition.

"And now, ladies and gentlemen, in conclusion let me say, in the years which I have served in the capacity of President of this Association, I must thank you for the patience which you have shown towards me, and for your kind indulgence in very many directions. While my work has not been what I might wish it had been, I assure you that my heart has been in this work, and hence from the very first I did what I could, in my way, to encourage those horticulturists living in our State, and while I have not done all I would like to have done, I am anxious to see the Society prosper, and while I shall retire from this office to give place to another, to that end shall I labor with might and main."

The committee on Floriculture, through JOHN DAVIS, then reported as follows:

FLORICULTURE.

Floriculture has now become an important industry in this section of the country, and has arrived at a point from which it is bound to make rapid strides.

Denver with her beautiful homes and their surroundings, is being made more and more beautiful every year

by the introduction of choice flower beds and foliage plants, ornamental trees and groups of shrubbery and hardy herbaceous plants. It is but a few years since a few shade trees and a bit of lawn were the sole attempts at ornamentation about our homes. Now, frequent are the beds of crocus, hyacinth, tulips and narcissus, that greet our senses on the first days of early spring; and even if our people have not the flower bed to decorate with, they decorate their windows with these early spring beauties.

We wonder that there are not more of these bulbs cultivated, for they are now so cheap, and are of such easy culture that every one could afford to adorn their gardens with a few. The sales of bulbs, we feel confident, have increased two hundred fold in the last two years.

Following these earliest spring flowers, we have pansies, a flower which, within the past few years has been developed wonderfully, until now the variety of colorings, and size of the flowers, are simply indescribable for beauty. Pansies can be raised from seed with fair success, but it is better to select a few choice varieties from some florist's beds, and then let them perpetuate themselves.

Beautiful effects in floriculture can be made with annuals, by sowing the seeds in April or May, out of doors, or some indoors, such as sweet peas, phlox, drummondii, alyssum, mignonette; calendulas, larkspur, candytuft, zinnias, single dahlias and a score of others. These old garden favorites of bygone days are now becoming fashionable again, and in this way their history is repeating itself. Certainly their beauty is not surpassed by any hot-house plants, and their usefulness is bound to increase as their better qualities become known to the present generation. No better sub-tropical

beds or foliage effects can be made than those produced by groups of recinus or castor bean, caunas, Brazilian beets, zea japonica, or striped maize, and these are either annuals grown from seed, or bulbous roots lifted and housed every winter. Hardy herbaceous plants are each year becoming more and more popular, and the new varieties of fleur delis, lilies, columbine, phlox, hollyhocks, penstemon, peonies, dianthus or China pink, and a dozen others, have yearly many new lovers of their beauty and usefulness. To know that a nice assortment of this class of plants can be planted out and left year after year to take care of themselves, with only a slight mulch and fertilizing, an occasional working of the soil, and a moderate amount of water, and to know that they will all care for themselves, no matter how severe the winter and come up bright and fresh in the spring, is a delight for many who do not want the trouble of annual flower gardening. Ornamental shrubs occupy a place in fancy gardening which cannot be filled with other plants, for no lawn of any extent is now complete in its landscape effects, unless there be an occasional clump of handsome lilacs, snowballs, spireas, barberry, either the highly ornamental purple leaf variety or the red fruited. The new introductions made of fine hybrids and novelties from Japan and Europe, add lists of varieties of these, whose name are legion, and in many instances they are no better than old originals.

To hide an unsightly corner, or make a screen, to make a background to a lawn, to line a drive, there is nothing equals shrubs of some of the classes named above. When we begin to enumerate the various bedding plants that crowd themselves upon our minds for consideration, we are almost bewildered, for they are almost numberless in variety. We can select from a list of thousands of geraniums, hundreds of verbenas

and roses, besides heliotrope, coleus, achyranthus and centaureas, dwarf nasturtiums, double feverfew and begonias. Any imaginable combination of these will give grand results, and they all thrive admirably in our bright sunshine and warm summer days. Our verandas, trellises or summer houses can be rendered a hundred fold more attractive with a few simple vines, such as honeysuckles, woodbine, or some of the very popular new clematis, for permanent planting, with an admixture of the fast growing annual cobea, canary flower, cinnamon vine, madeira vine or tall nasturtium. The much advertised moon flower or ipomea noctiphyton, has been sold by the thousands by Eastern florists, but it is not satisfactory. It grows fast enough, but is late coming into bloom, and our season proves too short for it, for just as it begins to develop its beauty it is cut down by frost. The Mexican morning glory, a tubrous rooted vine, is also too long in perfecting its beauty to be of much service in this country. Carpet bedding is still in its infancy in this region, and save a few neat and inexpensive beds of alternanthera, lobelia, golden fever and alyssum, there are no attempts made. In this particular, as in all others relative to floriculture, we most sadly need the education rendered from having in our midst public parks, well improved, under the supervision of a thoroughly competent park commissioner, one who is a practical gardener. From the amount of money our city appropriates each year for park work, such results ought to be obtained as the most fastidious need desire. Let the public purse first be used to make beautiful our public places, and it would not be many years before hundreds of our citizens would be vieing with each other to make home gardens more beautiful. Many of our people dislike to spend money freely for yard decoration, for the reason that they have no knowledge of what will do well in this soil and climate.

The day is not far distant when a reaction will take place and we will become celebrated for our fine parks and home gardens. Older cities employ the most skilled artists they can find, in working out landscape effects and making these beauty spots for the masses to enjoy, while here we are content with a few small trees planted each year and interspersed with fields of grain or grass. We are well aware that the tax-payers generally object to park assessments, but it seems no more than right that a part of the public funds should be used in this way, so long as all the results are for the public benefit. We do not need costly houses for palms and orchids, which require so much labor and expense to keep in proper shape, but ordinary glass structures will grow the most suitable plants for our climate, and with these we could have a beginning, and, as yearly public demand and interests required, further development could be made.

As for lists of what it is best to grow in our private grounds, and the rules of culture, it seems unnecessary to dwell upon, for there are myriad books, inexpensive and thorough, which are written in such attractive language, as to impress you better than any words I can write.

We cannot but be surprised at the constantly increasing demand for fine flowers, especially roses, and florists are constantly at their wit's ends to learn how to grow the best. There seems to be certain conditions of our soil, climate and water, that we do not thoroughly understand at present, and until these are surmounted we cannot hope for anything but ordinary results. The demand shows clearly that no flower grown is too rare or costly for our market, and the more new ideas introduced into floral work nowadays gets the cream of the trade.

Party decorations have now reached a point in Denver when they demand fine palms and exotics, and it is not long before we shall have to commence orchid growing, so as to be ready to give something new.

In reviewing the condition of floriculture in this portion of our State, we cannot but be pleased with what has been accomplished and with the outlook for the future. It has become an industry that now employs over \$50,000 capital, employs over 100 men, and gives good returns for the investment.

On motion duly made and seconded, the report was received and adopted.

COL. ENSIGN, from the Forestry Committee, reported as follows :

NEEDS OF LEGISLATION ON THE FORESTRY INTERESTS OF COLORADO.

By EDGAR T. ENSIGN.

The most urgent present requirement in the interest of Colorado, and other Rocky Mountain forests, is a general enactment withdrawing public timber lands from sale or entry, and providing an effective system of forest administration. Although bills for that purpose have been introduced at the present and previous sessions of Congress, our law makers have given them but little, if any, serious attention, and the destruction of forests in the public domain is increasing rather than diminishing.

The public forests in Colorado are suffering greater injury than those in other parts of the mountain region for the reason that railway construction, mining, charcoal and lumber manufacture, and other industries in

the State cause an' immense consumption of timber, far in excess of such demands in the neighboring territories.

The loss of the native forests here is specially harmful for the reason that they nourish and protect the sources of streams upon which our irrigation systems depend. As many know, after our forests have once been destroyed, their reproduction by natural processes is difficult, and often impossible.

The American Forestry Congress, various State forest associations and commissions, the Department of the Interior, Forestry Division (Department of Agriculture), and numerous other societies and individuals, are interested in the preservation of the forests, and have urged upon Congress the need of legislation in that behalf. The public press has also, in many instances, aided the cause by timely warning and entreaty ; in fact, it would seem that a healthful public sentiment is being formed favoring the conservation of forests.

The State forest administration, which consists of a State Forest Commission, in co-operation with the respective county commissioners and road overseers, has effected some good during the time that it has been in existence. Its work, in the matter of preventing and punishing forest depredation, is extremely limited, for the reason that the State authorities can exercise no direct control over the public timber lands. Whatever is done in that direction must be done through the federal authorities.

In my opinion, the forest needs in this State of greatest immediate importance, and which are within the power of our State Legislature to grant, are :

First—A joint memorial to Congress, setting forth the evils of forest destruction in this region, and praying for adequate remedial legislation.

Second—A law giving an annual bounty for a term of years to those persons who shall plant and successfully cultivate one or more acres of forest or fruit trees.

Third—Establish an "Arbor Day." Make it a legal holiday in all public schools, fixing the date, and the Governor, each year, to call attention to it by official proclamation, and request its general observance; the actual *planting* of trees to be done on the day designated, or at such other most convenient time as may be deemed expedient.

The committee on legislation of this Association has prepared a memorial and bills embracing the above named subjects, and recommend their passage at the present session of the General Assembly. It has also prepared, and will urge the passage of a bill authorizing incorporated towns and cities to establish, improve and maintain public parks and boulevards.

In the promotion of these several objects, it is hoped and expected that active aid and co-operation will be extended by this Association and its individual members.

MR. EASLEY read a resolution adopted by the State Grange at its last annual meeting, and on motion of MR. MCCLELLAND, seconded by MR. BROTHERS, the same was adopted.

PROF. LAKE, from the Committee on Geology, reported as follows :

GEOLOGY OF COLORADO SOILS.

That the soil of Colorado is mainly composed of mineral matter derived from the rocks of the country is apparent to any one who examines some section exposed in a railroad cutting, or along the banks of a stream, passing across our prairies. On the top of the bank the grass is growing; below it are a few inches of black earth; (2) below this is a stiff clay, more or less sandy, and of a drab, yellow or reddish tinge, with here and there a few pebbles. This clay stratum is from five to ten or more feet thick, and (3) is followed by a layer of pebbles of various sizes and of various rocks, the granitic type predominating; this is a few feet thick. (4) Lastly, we come to sandstone on the prairie, horizontal and stratified.

First—The first layer is composed of a large per cent. of organic matter, caused by the annual decay and re-growth of vegetation for a very long period, and may be called humus, black or vegetable soil, but with this we can detect a good deal of sand, and some shining particles, which we recognize as mica. This is the top dressing of our prairies, and largely contributes to its fertility. Of the same character are the fertile soils of Russia and the Tundias or steppes of northern Asia, which consists of the remains of frozen arctic mosses and other plants, fresh mosses growing on their dead ancestors. Peat beds are of the same character and origin. Animal remains, such as the droppings of the herds of buffalo, have contributed to this organic humus.

Second—The second layer or subsoil, consisting of clay and sand and a good deal of lime, will be found to consist almost wholly of finely pounded up rock, and the mineral elements of rock, such as potash, alumina, and

kaolin—its color is due to oxidation, or hydration of iron, originally derived from the parent rock.

Third—The third layer by its pebbles proclaims its rocky origin and the pebbles will be found to consist of many of the rocks of the country, the granitic type predominating. Generally speaking, we find the elements of granite to pervade the soil and subsoil, for the ingredients may be referred mainly to the elements of the three principal minerals composing granite, viz., quartz, mica and feldspar; the quartz supplying the hard sand, the mica, glistening particles, while the feldspar has become decomposed and yielded up its alumina, its potash, its lime and its iron color. Iron, which gives the red hue, is an ingredient of mica and hornblende, common minerals in granite. Below the pebbles we have the parent or bed-rock sandstone, which, again, under the microscope, or even to the eye, shows minute fragments of quartz, mica or feldspar, cemented together by iron or lime. In the case of many of the tertiary sandstones underlying Denver and part of the plains, we find crystals and fragments of lava, derived from lava flows, which issued from our mountains at one time, and largely covered portions of the prairie. Some of these lava flows are still visible along our foot-hills, capping table lands, as at Golden City, as at Sedalia, and on the Divide, and over the Raton Mountains near Trinidad. It will be conceded then, that top soil, subsoil, even down to bed-rock, sandstone, for a depth of 20 feet, is principally composed of the comminuted debris of the rocks of the country. It remains then for the geologist to describe the common rocks of Colorado, since they are the parents of the soils; to show how they are distributed over the country, and what there is in their composition which gives fertility or aridity to certain soils derived from them, or to certain districts where

particular rocks predominate. Before we do this, however, we must remark that some soils are formed *in situ* from the actual decay of the parent rock immediately beneath them. Others, and the large proportion, are transported or made soils, the ingredients of which, by the medium of water or wind, have been brought from a distance more or less near or far off.

To begin then with the granite, the origin and parent of nearly all sedimentary rocks, and therefore the grand-parent of nearly all soils.

Granite with its varieties of gneiss, schist, etc., form, as you all know, the main axes of our mountain ranges. Upon its broad back and along its flanks, on both sides of the different range, recline the various sedimentary formations, dipping off from it at various angles, limestones, shales, sandstones, clays, drift pebbles, one more or less behind the other in hog-backs, or like waves of stone, wave following wave, till out on the ocean-like prairie, these billows all become horizontal, and are found by artesian boring lying in successive order, one beneath the other. We shall find as we examine each of these waves or hog-backs of stone in their successive order, that about nine-tenths of them derive their origin directly or indirectly from the parent granite, and yet we have plenty of granite left for future supplies, for our cañons pierce through one hundred miles thickness of it. The first range ere we reach the intervals of sedimentary rock caused by the valleys of the park system, and then again we pass through some fifty miles or more of it, as we go through the mighty Saguache range, all of whose parks rise to twelve or fourteen thousand feet, and as for length, both ranges run the length of Colorado and a great deal further. Are we surprised then that the derivation of rocks and soils has drawn so largely from so huge a parent and so vast a source? The soil of our moun-

tain farms, usually located in little valleys, is entirely derived from the elements of these rocks alone, mingled with a great deal of humus, derived from the decay of forest and vegetation. It is mostly transported soil, brought down by glaciers, floods and rain from the adjacent granite hill.

Granite is composed of three minerals, mica, quartz and feldspar; it is the latter that yields the fertilizing element. Feldspar is composed of quartz, alumina and a large amount of potash and some lime; quartz and alumina are nearly insoluble, and supply the sand and gravel; the potash and lime, very soluble, are as you all know the essence of fertilization. Now, if as we said nine-tenths of the rocks derived from these, such as sandstones and clays—the limestones excepted—give to them their fertilizing minerals, we understand the fertile element we find in the soils derived from them. As an instance of the fertile influence of the potash of the feldspar, we may cite the fir tree. Who has not noticed it issuing from some crevice in almost solid granite? "Growing where no life is seen, a rare old tree is the fir tree green." What does it live on? Simply upon a little sandy soil, blown by winds or carried by water into the narrow crevice, that meager soil contains the quintessence of fertility, viz, the potash derived from the feldspar of the granite. Change that cliff into limestone, and you will have no such fir trees.

Now sandstones, for the most part, are nothing more than granite worked up into fragments and consolidated, a stratified rock; hence you will see along foot-hills, fir trees growing abundantly on the sandstone hog-backs, but the limestone belts are bare of them.

The red character of granite soils and of some sandstones derived from them, is derived from the iron so largely diffused through the minerals composing the

granite. That some sandstones are white, and some soils light, is due to the agencies of plants; when those sandstones were soils, the plants, by their acids, and by giving access to percolating water through their roots, had deoxidized the iron, and leached it out, and left the sandstone or sand soil, white or pale gray. Soils that are untouched by vegetation are generally red, the iron not having been chemically reduced by the plant agencies.

From the granite axis now we turn to the foot-hills and examine the character of the several hog-backs, one after the other, reclining back from the granite. Opposite Denver, and for hundreds of miles, the first rock we meet is a red coarse sandstone; it is composed of granite pebbles, cemented by granite sand, and has evidently been derived directly from the adjacent granite by the action of old sea, beating against the granite cliffs; it is an ancient shore line, and geologists call it the Triassic. The soil in its vicinity is red, very gravelly, but gives some good grazing ground, and the rocks support sometimes a heavy growth of pine trees.

Next in order comes a belt of limestone, not very thick, and with it thick beds of highly colored marly clays and limy shales, red, maroon or greenish. Now, the limestone has nothing to do with the granite; it was formed by the agencies of coral polyps, secreting the lime from the sea waters, and leaving behind them little skeletons of fine lime rock. The sandstones and clays, however, have some granite in them, and these mixed with the lime, make a fine red loam soil, very good for most purposes—it is further enriched by a certain amount of gypsum, which is fertilizing in small quantities. This limestone is nearly pure carbonate of lime; if it were magnesia or dolomite, as some of the limestones in the high mountain regions are, we should see a sterile influence produced on the soil. Over portions of the

mountains of South Park, where the Silurian dolomitic magnesian limestones prevail, scarcely anything grows but a few moses. This second set of rocks geologists call Jurassic. Then come a few more sandstones, lofty hog-backs, and then a few limestones, and an enormous thickness of drab, sticky clays and shales, with a great deal of lime and gypsum mixed with them. These clay beds generally form a wide belt or valley along the flanks of our hog-backs, and give us a great many of our good grain and hay and grazing farms.

Towards the southern part of our State, from Colorado Springs to New Mexico, these clays form the adobe soil of those districts, which are often exceedingly fertile. This set of rocks we call the marine cretaceous. The next set of hog-backs and rocks brings us to the level of the prairie, or to that class of rocks, the upper strata of which form the underlying surface of our great prairies, from Denver to the Missouri River. They are sandstones, shales and clays, some of them containing the debris of granite; some the debris of lavas, whose constituents are very similar to those of granite; they are fertile potash rocks then, and yield also, our important coal beds. They are called the Laramie Group, and by some are considered cretaceous, by others tertiary.

On top of the prairie, we have locally, a few table lands; these are mostly composed of some sandstones and clays, and the ingredients are generally pounded up granite, or pounded up lava. Often, as in the case of the table mountains at Golden, these lava sandstones are themselves capped by a hundred feet or more of basaltic lava. The potash in the feldspar of these volcanic rocks and volcanic sandstones makes the soil from them peculiarly fertile, and particularly well adapted for the growth of vines. It is on such volcanic soils that

the vineyards of Naples and Sicily and the Mediterranean flourish. For thousands of square acres between Denver and Golden and the foot-hills, the influence of these basaltic rocks is found in the soils, a very large area once having been covered by lava, and now by the ruins of it, in the form of drift pebbles and comminuted debris, hence the rich farms for fruit between Denver and Golden. Above this is the pebbly drift; this is rather a nuisance to farmers, as it covers his land with boulders. Above this, however, is the *Loess*, a sandy clay, some ten or twenty feet thick, which is the subsoil of our prairies from the Rockies to the Missouri, and has remarkably fertile qualities. An analysis of this at Golden gives:

| | |
|------------------------------------|------------------|
| Silica | 72.312 per cent. |
| Alumina | 12.664 " " |
| Sesquioxide Iron | 4.669 " " |
| Lime | 1.147 " " |
| Magnesia | 0.944 " " |
| Potash | 3.748 " " |
| Soda | 2.472 " " |
| Water and organic matter | 1.797 " " |
| Phosphoric acid | 0.228 " " |

The origin of this *Loess* is the residue of a lake or series of vast lakes of fresh water that covered the greater part of the area between the Rockies and the Missouri.

The origin of the drift is from the glaciers that, at the glacial epoch, occupied every canon in our mountains. They eroded out great gulches in the granite, brought down the debris on their icy backs and landed it on the plains. When these great bodies of ice melted, great lakes and violent great rivers resulted, which carried the *glacial detritus* still further on to the plains, so it is that the glaciers and subsequent floods and rivers passing first through the granite, and through all the varied hog-backs or the foot-hills, gives us our drift soil,

a heterogeneous collection of every rock known in Colorado, the decomposition of which gives us drift clays and soils. To the still waters of the great lakes following after the glacial era, we attribute the formation, and on top of this comes the modern humus and vegetable soil, and still later vegetation. As to the agencies by which this soil has been reduced from rocks and distributed, water has been the most powerful, but the perpetual winds that generally blow from the north-west have done much also in distributing the elements of the mountain rocks over the prairies. Ants, burrowing gophers and prairie dogs, have also aided in the general soil making and distribution.

To our forestry friends, I would say, that you would be glad if you could resuscitate some of the vegetable and trees that are now buried in stone in the strata beneath our prairie sod, for then you could clothe again these arid plains with the palm, sycamore, fig, laurel, magnolia, sweet gum, oak, plum, chestnut, which in the tertiary period luxuriated here, but alas, "times have changed and we have changed with them." It is for you yet, by artificial means, to restore Paradise, and bring back to us what was once a Garden of Eden.

On motion, duly made and seconded, the report of PROF. LAKE was received and adopted.

DISCUSSION.

E. T. ENSIGN said: Would we like to have restored the semi-tropical vegetation? I think not. We want Colorado. We want to make the plains of Colorado luxuriant with vegetation.

D. S. GRIMES said: In regard to the statement of the fir trees growing in the crevices of rocks without anything, apparently, to support them. Some trees draw their nourishment almost wholly from the soil,

others from the atmosphere; the fir tree belongs to the latter class. Around Puget Sound the soil is not very fertile, but trees are very abundant there, and draw their support, not from the soil, but from the atmosphere. Potash, I believe, has a more powerful effect on trees and vegetation than any other element.

MR. A. LAKE said: I agree with the gentleman. The theory I presented was hypothetical.

MR. EASLEY—Which is the most tenacious, Colorado soil, or the rich soil of Illinois?

MR. LAKE—I think the clay of Colorado more tenacious than the rich fine soils.

On motion of DR. SHAW the meeting adjourned until 7:30 p. m.

January 10, 1889, 7:30 p. m.

Meeting called to order by President Gipson.

Mr. JAMES ACKERMAN presented the following paper, on the subject of

OVERPRODUCTION.

I was requested by your worthy Secretary to prepare a paper on Fruit Growing in St. Vrain Valley, but you will find in volume I, page 99, an able paper from Mr. Webster, giving a history of the pioneer fruit growing of St. Vrain Valley. As that was six years ago, I might add to it, but as a matter of record for this Society he (Mr. Webster) would certainly be better authority than I would, as he was on the ground some years before I came to Colorado. For these reasons I have declined to comply with the request, but have selected another topic that I have heard a great deal of talk about, viz., "Overproduction."

It is an old adage, this world is what we make it. In our every day walk in life it is surprising to see the variety of temperaments, the sanguine man—the despondent man: one looking ahead into bright sunshine, the other looking forward to dark clouds, ever fearful that he may fall into some trap or be caught in a snare. I have been led to these thoughts by the repeated questions asked me, “Why, what will we do with our fruit, every one planting trees, by and by we will be obliged to grub out our trees, and abandon fruit raising?” The old croak of years gone by! And still fruit is scarce and living high. For example, when I came to Colorado in the spring of 1871 wheat was six cents per pound; if it went below four cents we must look to some other State to supply our wheat. The facts in the case: we have sold several crops of wheat at prices ranging from forty-five to sixty cents, and still we are here, and, from my standpoint, just as prosperous as those in neighboring States. When we meet one of those sanguine men let us pat him on the back and bid him God speed. Talk not to me of overproduction, and particularly the apple, which is being most extensively planted. I know not what may be in the future, but from the present outlook there is but a small proportion of Colorado that is naturally adapted to fruit growing, a narrow strip—say ten or twelve miles wide along the base of the mountains—seems to be the most desirable at present, and quite a large proportion of even that strip is taken up by those who seem to have no interest in fruit. For our peaches and apricots, we shall undoubtedly have to look to the western and south-western part of our State for a supply, but for the standard fruits, I will boldly say that the overproduction of fruits in Colorado is almost among the impossibilities as our consumers exceed our producers and if fruit is largely produced it will be largely consumed.

As to prices, four to six cents per pound may not be maintained but as our orchards grow older we have a better system of handling, new markets are opening here and there, we can produce cheaper, I can see no lion in the way, can you? Will Arapahoe and Jefferson counties always supply the Denver market? Boulder, Weld and Larimer counties will not more than supply their mining camps, and the open country east of them. Gunnison and Delta valleys have all they can do to supply their non-producers; and where must Leadville and other like cities look for their fruit? Another point, must we always expect to have Michigan and New York supply us with evaporated fruit? I think we can evaporate as cheaply in Colorado as elsewhere, then why not do it in seasons of plenty? It is honorable and right to be independent; if it is economy for me to dry the fruit for my family it is certainly economy for the State of Colorado to do likewise.

Just a word for the pear: I can raise in Boulder county just as good pears, and as cheap, as they can in California. Then why depend on importation? The same may be said of the plum. I have no means of knowing the amount in dollars and cents of the four articles, apples, pears, plums and evaporated fruits, brought into Colorado in the year just past—perhaps some of your Denver commission men can give us, before this meeting closes, the figures—at any rate I can see no good reason why in the near future we cannot supply Colorado with Colorado fruit. But I have wandered from my text—been talking of short rations instead of overproduction. If Colorado horticulturists will study to produce apples A No. 1 in quality and not a great quantity, I will guarantee that the market will not be glutted.

It matters not what my practice is, my theory would be fertilize thoroughly, increase the size and you will be sure to increase the quantity, and if the quantity is large then you will see the smiling faces. And still, these very sunshiny men are the ones who talk the most of overproduction; give them an abundant crop, prices do not suit; give them a short crop, we cannot depend on fruit in Colorado, we may as well give it up first as last. Ungrateful man!

I am getting to be an old man—have raised a large family; the All Wise Creator has provided for me and mine through adversity as well as in prosperity, and I have decided that He knows, and for one I shall trust Him while life may last.

DISCUSSION.

MR. MILLESON: What varieties of pears does Mr. Ackerman raise?

MR. ACKERMAN: I had two Flemish Beauty trees, about twelve years old, from which I gathered fifteen bushels; I have two Clapp's Favorite, from which I had about one bushel; two Osborne's Summer, from which I gathered four or five bushels. I don't have the Bartlett. All pears I have raised have been successful.

Judge W. B. FELTON, from the committee on Pomology, reported as follows:

REPORT ON POMOLOGY IN FREMONT COUNTY FOR 1888.

In reporting the condition of the various fruits in Fremont county for 1888, I will endeavor, so far as I am able, to give the cause for failure or partial failure of such kinds as did not do as well as usual. I will commence with the strawberry, the fruit first in the market,

and the universal favorite of all. The crop was not more than half an average, and I am unable to state the cause. I can state conditions which may lead some of my hearers to conclusions as to the cause. When the crop of 1887 had been gathered the vines lacked the usual vigor, for but very few new plants were formed. They appeared to stand still, without life enough to multiply themselves. What plants there were passed through the winter in good condition, and bloomed out well in the spring, but a large proportion of the bloom blasted. There was no frost to blast the bloom, but there was a continuance of cold nights through May, that may have chilled, although it did not quite freeze the bloom. The weather record at Cañon City, taken for the Signal Service Bureau, shows that March 26 and 27, 1888, were very cold days, the mercury being within 8° of zero on the 26th, and within 3° on the 27th. From that time on until the 22d day of October, a period of seven months, less five days, the mercury did not go below freezing, yet April was colder than usual, and May considerably colder than the average May. And right here, we think is the proper place to give a short summary of the weather at Cañon City during the year 1888:

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|---|-------|
| January | 32.4° |
| February | 41.1 |
| March. | 40.5 |
| April | 56.3 |
| May | 60.1 |
| June | 76.0 |
| July. | 78.5 |
| August | 69.1 |
| September. | 66.0 |
| October | 52.4 |
| November. | 39.5 |
| December. | 40.8 |
| Mean temperature for the year | 54.4° |

The total precipitation for the year was $11\frac{1}{4}$ inches.
 The mean temperature at Denver during 1888 was 49° .

The daily temperature at Cañon City was $5\frac{4}{10}^{\circ}$ warmer than at Denver. The total precipitation at Denver for the year was $1\frac{3}{4}$ inches less than at Cañon City. Now to proceed with the strawberry discussion, I will state that the unusually warm weather in February started the vines early, and they had made quite a growth when the cold spell the latter part of March must have given them a sudden shock. However, they bloomed well, but as before stated, many of the blooms blasted. A singular thing was noticed in about all the strawberry patches, viz: berries partially grown were observed with leaves growing out of and around the berry, which was considered an evidence of an unusual check, from some cause, to the growth of the berry, which had produced an abnormal growth. The questions to be answered are, what caused the weakly condition of the plants in the summer and fall of 1887, and was that the sole cause of the partial failure of the crop; or, did the cold weather of May (although not cold enough to frost) check the growth and maturity of the berries? I felt considerably interested in observing the conditions and results, and have given the matter in detail, because it may strike the attention of some one better able than myself to give a solution of the matter. The climatic conditions that I have given, together with another which I shall now give, will explain the cause of the failure, or the partial failure, of those kinds that did not produce a full crop.

The grape crop at Cañon was a complete failure in 1888 for the first time since grapes have been raised there, that is, grapes that had not been covered, and as but few grapes are covered there, except the foreign varieties, it was substantially a failure of the grape crop. The damage was done the latter part of November, 1887. The weather through October and November had been warm, which was followed by a very sudden

change to cold, the mercury going to about 7° below zero. That cold spell killed the fruit buds on the grape vines, and on the peach and cherry trees, and sadly damaged red and black raspberry and blackberry canes; and in consequence there was only a partial crop of those berries.

The pear bud went through all right until the cold spell the latter part of March; at that time most of the buds were considerably swollen, and were killed. It was not a universal slaughter, and there was a partial crop, some trees being well filled with luscious fruit.

Crabs mostly succumbed at the same time, as did a few varieties of standard apples. The varieties of apples whose buds start earliest, were badly nipped, of which may be mentioned the Golden Russet, Wealthy, Jonathan, Early Harvest. The wild plums were as full as they possibly could have been; a few varieties of tame plums were well filled, while others bore sparingly or not at all. Gooseberries bore a full crop. Most varieties of apples did exceedingly well, and the crop the county over, was very large. I had about 2,000 bushels from five acres of apple orchard (trees in the eighth season from planting) that bore 1,300 bushels in 1887. Jesse Frazer's crop was estimated at fully 15,000 bushels, and the entire crop of the county must have been in the neighborhood of 40,000 bushels.

One of the most important things for the fruit grower to consider, is how to destroy the codlin moth, so as to have sound apples. Spraying the trees with London purple was tried at Cañon this year for the first time, and I presume it is a good thing; but it appears to me that it is not all that is necessary. Trees cannot be sprayed with London purple or other poisonous substances after the apples have turned down, and the codlin moth appears to me to continue its ravages up to

picking time. Jesse Frazer used a patent lantern for catching the codlin moth; he had twenty-eight in his orchard, and kept them burning nights from early in May until about the first of September, and whereas his crop two years ago was extremely wormy, last season his apples were very free from worms. He says he shall get more lanterns and continue the use of them the coming season. Putting cloths around trees to catch the worms as they crawl up or down the trees is advocated by some, and some use tar. It is very important that we gain all the light possible about the habits of the moth, and about the best methods for protecting the apples against their ravages. Another thing that should be determined definitely by experiments conducted intelligently, to determine whether trees gain by mulching or other means. It is a general opinion that trees can be kept back, but that opinion is controverted. If they can be, the pear crop can be made the most profitable of all fruit crops. The warm weather common in February does more damage to fruit, one year with another, at Canon City, than anything else. Pear, cherry, peach, crab and all the earlier blossoming varieties start during such warm weather, and get caught later.

While I have been calling attention to failures and partial failures, the fact remains that, one year with another, the fruit growers at Cañon City and vicinity, are receiving handsome returns upon their money invested in fruit.

Upon motion duly made and seconded, the report was received and adopted.

Then followed a discussion on different topics.

Dr. SHAW then presented his paper entitled "An Object Lesson, Fruits on Exhibition," which was as follows:

Ladies and Gentlemen—We present to you this collection of apples as a demonstrative proof of the possibilities of Colorado becoming the peer of any other State, as an apple growing State. That which cannot be demonstrated always leaves a doubt. The 150 varieties and about 5,000 specimens, while indescribable in language, yet material in form, beautiful in color, pleasant in taste, indicate that Colorado in the near future will be self-reliant in the production of the king of fruits, the apple.

A conservative estimate will make the yield of 1888 about 60,000 bushels. The 20,000 apple trees planted in 1888 will soon save a cash drainage of \$2,000,000 per year to the State.

The apple is a topic of importance during our meeting. The details of orchard culture will also be another. The samples on show indicate we can grow almost any variety that can be grown elsewhere. Apple tree culture is like the treatment of animals—must be treated according to age. The habits of varieties while young are tender and require age to withstand climatic changes, hence variations in success; extremes of heat and cold are less varied in Colorado than in any State in the United States; more bright sunshiny days are found than elsewhere, an element of success in apple growing, especially so where beauty of color is desired.

As indicated by the object lesson before us, no country of which I have any knowledge paints apples of so bright and high a color as the Rocky Mountain region.

The show before us presents another noticeable feature, viz: their good state of preservation in mid-winter,

showing good keeping qualities. These specimens were picked from the trees the middle of September, extending until the middle of October, being in store about three months.

I have been in attendance at two World's Fairs, and among an exhibit of 20,000 plates I have never before seen 150 kinds showing so few defects. Colorado leads the van of any country in keeping qualities of fruit. God has made the conditions of success and man makes the failure of apple raising in Colorado. The price of fruit success in any country is labor, care and good judgment, and where all the conditions of success are observed no failure is found.

The magnitude of the area of Colorado is sensational compared with most other States, being larger than many of the divisions of the Eastern Hemisphere, larger than the combined area of New York and Pennsylvania. The contour of its surface is so varied as to have an altitude ranging from about 3,000 to 14,000 and a soil as varied as the altitude, thus making it possible to grow several hundred kinds of tree fruits. The samples of fruit on our tables are an object lesson strangely suggestive of the certainty of Colorado being at least a good apple State. A study of the conditions of apple growing shows the State to be the peer of any State claiming to be an apple growing region, and the samples we present demonstrate that our claim is well founded.

Men are like children—learn best by an object lesson—hence at some trouble and expense, we have got these samples grown in all the principal orchards of the State, extending over an area of about 600 miles from north to south. The display is chiefly of winter varieties, consisting of about 150.

As a condition precedent to success, irrigating water must be at command in Colorado. The details of its application will be a topic for discussion.

The show of 150 varieties of apples on our tables, in a practical point of view, is made to show possibilities rather than utility.

The practical study of the habits and qualities of a limited number of kinds is a matter of more importance and profit than to take in the range of those kinds whose names number thousands.

In the choice of kinds for profit and satisfactory results, the rule should be to select such kinds as will give a succession of fruits the year around. The kinds to be selected should be classified into summer, fall and winter varieties.

We wish to turn our show of apples to a practical use as an object lesson to personate the individual kinds most approved.

The fruit of the summer kinds being perishable, we have no sample to show, and mention eight of the most approved by name, being hardy and prolific: Duchess of Oldenburg, Red Astrachan, Sops of Wine, Red June, Early Harvest, Jeffrey's and Striped Jelly Flower, Yellow Transparents; as a predicate to the list I here mention and propose to show only such specimens as I have seen fruiting and grown in a healthy condition in the State. As a matter of convenience, all samples shown in the list named will be arranged on a table called sample kinds recommended. The samples shown will be subject to the practical criticisms that may follow the discussion of this paper, and can be added to or taken from according to the judgment of the meeting. For the sake of brevity in this paper, the list of names here

given will be winter, leaving all comments as to merits to be given only and in a conversational style.

Fall Varieties: Summer Queen, Grimes' Golden Wealthy, Maiden's Blush, Buckingham Snow, Autumn, Strawberry, Lady, Sweet Bailey, Sweet Pear.

Winter Varieties: As a predicate to this I will here state that I know of no kind of winter apple grown elsewhere with success that will not succeed in Colorado. Ben Davis, Walbridge, Rome Beauty, Jonathan, Pewaukee, Isham Sweet, Northern Spy, Plum's Cider, Tallman's Sweet, Missouri Pippin, King, Tompkins County, Gideon, Janet, Wine Sap, Red Romanite, Red Winter Pearmain, White Winter Pearmain, Utter's Red, Flushing Spitzenberg, Wolf River. Special attention is called to a special table of about 60 seedlings of Colorado grown, and special note made of 34 grown by J. and H. Toof, of Beaver Creek, Fremont county.

DR. SHAW moved that a committee be appointed, composed of MESSRS. FELTON, FRAZER, ACKERMAN, FAUROT and BROTHERS, to select from the apples on the table those best adapted to the use of an individual desirous of planting an orchard.

The motion being duly seconded, prevailed.

MR. S. O. OSBORNE offered the following, and moved its adoption :

Resolved, That this Society extends to the members of the Legislature a cordial invitation to attend its meetings, and earnestly requests them to make at least one visit to see the fruit display.

The motion was seconded by MR. MILLESON, and carried.

On motion the meeting adjourned until January 11, 1889, at 9 a. m.

NOTE BY SECRETARY. By request of Denver Real Estate Exchange, three barrels of apples on exhibition were sent to the care of Mr. Orcott, of Boston, to be placed on exhibition. Complimentary letters were received through the city papers and members of the Massachusetts State Horticultural Society commending in strong terms the specimens sent, as to beauty, color, size, smoothness and keeping qualities. There was a barrel sent at the same time to the Pomological Department at Washington City which brought in answer the following letters as a response:

U. S. DEPARTMENT OF AGRICULTURE, }
DIVISION OF POMOLOGY, }
WASHINGTON, D. C., Feb. 7, 1889. }

DR. ALEX. SHAW, *Secretary*,
Denver, Colo.,

Dear Sir—In the absence of Prof. VanDeman, who has just gone to Florida to attend the meeting of the American Pomological Society, I take pleasure in acknowledging receipt of your kind favor of the 24th ultimo, together with the barrel of specimen apples described therein. The fruit came to hand in very fine condition, and I can safely say that no finer specimens have ever been received at this office than are those of some of the varieties which you send. It is very interesting to note the differences in the same varieties of apples occasioned by variations of altitude and other climatic conditions. For brilliancy of color, general appearance, firmness, and, I am sure for keeping qualities, the apples of Colorado will stand in the front rank. The question has been asked, if this fruit was raised by means of irrigation, and it would be interesting if you would state the conditions of culture under which they were produced.

Owing to the fact that the Paris Exposition does not open until the fifth of May, and the great difficulty in handling and transporting in varied temperatures, as is unavoidable without cold storage facilities, we have

employed Col. Brackett, of Iowa, to model specimens of the finer fruits in order that they may be represented during the whole of the Exposition. It is barely possible that there will be opportunity for sending some fresh fruits during the coming season, while they are in their prime, for the purpose of making a temporary display.

Thanking you for your attention and kindness, and hoping to hear from you at your convenience, I remain,
Very truly yours,

C. L. HOPKINS,
Acting Pomologist.

— — —
U. S. DEPARTMENT OF AGRICULTURE, }
DIVISION OF POMOLOGY, }
WASHINGTON, D. C., Feb. 19, 1889. }

DR. ALEXANDER SHAW, *Secretary*,
Denver, Colo.,

Dear Sir—Your favor of the twelfth instant has been received and contents noted. I had naturally supposed that the fruits sent by you were raised by irrigation and it is certainly in that climate and under the conditions existing there, not at all against it. The conditions existing in Colorado relative to the cultivation of soil are so different from the conditions existing in the East that it is hard for people unacquainted with that difference to realize the necessity for or the advantages of irrigation over the old fashioned way. Although in regions of country where there is excessive heat, it is a generally understood fact that the keeping qualities and high flavor of fruits are much injured by excessive irrigation, yet I do not think that this is true in higher latitudes or altitudes, as in the valleys of Colorado. Indeed, I am convinced from the appearance of Colorado apples thus far seen that they will stand at the head for keeping qualities. I believe it to be true, as you say, that the future prosperity of any State, and your State in particular, is dependent upon her agricultural resources, although Colorado's mineral wealth is large and has

been the means of attracting to its borders the people of the East, and this prosperity largely depends upon thoroughly reliable means of conserving your water supply. As attention is being directed to this question respecting large areas of the West, methods will undoubtedly be adopted which will abundantly accomplish this result.

It is to be hoped that this office in the future may be of value to your Society and the fruit interests of your State and we hope that any time when it is possible for us to assist you that you will make it known,

Thanking you for your kind offer and assuring you that should occasion arise we will be pleased to avail ourselves of it, I remain, sir,

Very truly yours,

C. L. HOPKINS,

Acting Pomologist.

METEOROLOGICAL TABLES.

The following meteorological tables in a tabulated form is the record as kept at the experimental station at the Agricultural College of Colorado. To the students of horticulture, these tables are a faithful record of such climatic changes as are incident to Colorado, as recorded by a series of approved instruments, a graphic description of which may be read in the notes preceding these tables, by Professor Carpenter, meteorologist and engineer:

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|----------------------------------|---------|---------|-------|---------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 1 | 25 | 41 | 34 | 33½ | 40 | 10 | 33 | 12 | 24.640 | 24.500 | 24.500 | 24.547 |
| 2 | 26 | 38 | 25 | 29½ | 38 | 26 | 42 | 8 | 24.640 | 24.750 | 24.690 | 24.693 |
| 3 | 36 | 60 | 55 | 50½ | 53 | 23 | 24 | 11 | 24.380 | 24.320 | 24.360 | 24.353 |
| 4 | 32 | 30 | 20 | 27½ | 64 | 28 | . | 6 | 24.490 | 24.620 | 24.590 | 24.567 |
| 5 | 18 | 25 | 21 | 21½ | 55 | 18 | . | 11 | 24.515 | 24.610 | 24.690 | 24.605 |
| 6 | 7 | 10 | -2 | 5 | 24 | 16 | . | 15 | 24.690 | 24.675 | 24.790 | 24.718 |
| 7 | -15 | 8 | -9 | -5½ | 13 | -15 | 45 | 11 | 24.780 | 24.780 | 24.840 | 24.800 |
| 8 | -12 | -15 | -4 | -10½ | 15 | -12 | 48 | 9 | 24.840 | 24.790 | 24.880 | 24.837 |
| 9 | -14 | 19 | 1 | 2 | 24 | -14 | 40 | 8 | 24.840 | 24.840 | 24.950 | 24.877 |
| 10 | 1 | 41 | 14 | 18½ | 38 | 18 | 44 | 26 | 24.890 | 24.890 | 25.065 | 24.948 |
| 11 | 8 | 40 | 24 | 24 | 42 | 10 | 36 | 11 | 24.950 | 24.740 | 24.490 | 24.727 |
| 12 | 34 | 33 | 25 | 30½ | 44 | 9 | 26 | . | 24.330 | 24.500 | 24.680 | 24.503 |
| 13 | 5 | 14 | -10 | 3 | 37 | 20 | 7 | 25 | 24.765 | 24.590 | 24.790 | 24.715 |
| 14 | -15 | -4 | -17 | -12 | 27 | -16 | . | 4 | 24.915 | 24.985 | 25.070 | 24.990 |
| 15 | -28 | 2 | -17 | -14½ | 2 | -28 | 60 | 7 | 25.075 | 24.990 | 24.965 | 25.010 |
| 16 | -15 | 21 | -1 | 1½ | 7 | -17 | 65 | 8 | 24.760 | 24.685 | 24.750 | 24.731 |
| 17 | 6 | 30 | 16 | 17½ | 41 | 0 | 35 | 14 | 24.835 | 25.040 | 25.195 | 25.023 |
| 18 | 6 | 39 | 21 | 22 | 41 | 2 | 39 | 9 | 25.205 | 25.100 | 24.990 | 25.098 |
| 19 | 16 | 37 | 2 | 18½ | 40 | 13 | 14 | 12 | 24.835 | 24.790 | 24.895 | 24.840 |
| 20 | -8 | 9 | -2 | -1½ | 10 | -8 | 41 | 5 | 24.815 | 24.740 | 24.755 | 24.770 |
| 21 | -3 | 38 | 24 | 19½ | 45 | -6 | 37 | . | 24.690 | 24.690 | 24.850 | 24.743 |
| 22 | 17 | 56 | 43 | 38½ | 58 | 13 | . | . | 24.840 | 24.795 | 24.925 | 24.853 |
| 23 | 19 | 37 | 25 | 27 | 38 | 18 | 7 | . | 25.020 | 24.960 | 24.800 | 24.927 |
| 24 | 27 | 48 | 40 | 38½ | 50 | 22 | 39 | . | 24.710 | 24.790 | 24.840 | 24.780 |
| 25 | 20 | 61 | 51 | 44 | 62 | 19 | 38 | . | 24.975 | 24.985 | 25.090 | 25.017 |
| 26 | 52 | 56 | 46 | 51½ | 71 | 35 | 35 | . | 25.040 | 25.085 | 25.140 | 25.088 |
| 27 | 26 | 66 | 35 | 42½ | 70 | 26 | 36 | . | 25.120 | 24.990 | 25.000 | 25.037 |

THE MONTH OF JANUARY, 1888.

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION. | | | WIND. | | | |
|-------------------|--|---------|---------|---------------------------|---------|---------|----------------|---------|---------------------------|---------|---------|---------|------------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow. | 7 a. m. | 2 p. m. | 9 p. m. | Daily movement, miles. |
| 1 | 40 | 17 | 44 | 4 | 0 | 14 | ... | ... | ... | NW | E | N | 100 |
| 2 | 53 | 66 | 40 | 11 | 28 | 4 | ... | ... | ... | N | SW | NW | 50 |
| 3 | 64 | 58 | 59 | 25 | 45 | 41 | ... | ... | ... | SW | SW | W | 96 |
| 4 | 61 | 68 | 58 | 20 | 21 | 7 | ... | ... | ... | W | E | E | 45 |
| 5 | 61 | 63 | 59 | 6 | 14 | 9 | 11 am | 5 pm | .08 | N | E | E | 125 |
| 6 | 58 | 30 | 10 | -5 | -15 | -34 | ... | ... | ... | E | E | SE | 157 |
| 7 | 4 | 26 | 25 | -65 | -20 | -34 | ... | ... | ... | SW | S | N | 81 |
| 8 | 20 | 43 | 13 | -40 | -4 | -40 | ... | ... | ... | W | N | NW | 69 |
| 9 | 9 | 51 | 30 | -55 | 3 | 23 | ... | ... | ... | N | NW | NW | 62 |
| 10 | 30 | 54 | 40 | 23 | 26 | -6 | ... | ... | ... | W | W | N | 71 |
| 11 | 50 | 62 | 67 | -8 | 28 | 15 | ... | ... | ... | SE | SE | N | 80 |
| 12 | 75 | 33 | 67 | 27 | 8 | 16 | ... | ... | ... | W | W | W | 445 |
| 13 | 38 | 25 | 25 | -15 | -15 | -36 | 3:30 p m | ... | ... | NW | E | NE | 165 |
| 14 | 4 | 14 | 4 | -65 | -40 | -67 | 9 am | 0.21 | ... | ... | SE | NW | 75 |
| 15 | 9 | 32 | 4 | -95 | -21 | -67 | ... | ... | ... | ... | N | NE | 59 |
| 16 | 4 | 59 | 22 | -65 | 9 | -30 | ... | ... | ... | W | NE | N | 66 |
| 17 | 47 | 58 | 59 | -12 | 17 | 4 | ... | ... | ... | W | W | S | 47 |
| 18 | 47 | 51 | 59 | -12 | 22 | 9 | ... | ... | ... | S | SE | W | 83 |
| 19 | 68 | 40 | 32 | 7 | 15 | -21 | ... | ... | ... | N | S | S | 167 |
| 20 | 30 | 49 | 19 | -31 | -7 | -33 | ... | ... | ... | E | E | S | 83 |
| 21 | 16 | 57 | 50 | -36 | 24 | 8 | ... | ... | ... | W | SE | ... | 72 |
| 22 | 69 | 71 | 85 | 8 | 47 | 39 | ... | ... | ... | W | E | NW | 138 |
| 23 | 71 | 56 | 63 | 11 | 23 | 14 | ... | ... | ... | NW | ... | W | 80 |
| 24 | 66 | 23 | 22 | 17 | 12 | 4 | ... | ... | ... | W | W | NW | 264 |
| 25 | 62 | 31 | 50 | 9 | 30 | 33 | ... | ... | ... | W | W | N | 178 |
| 26 | 51 | 44 | 58 | 34 | 34 | 32 | ... | ... | ... | W | W | ... | 67 |
| 27 | 65 | 40 | 72 | 16 | 44 | 27 | ... | ... | ... | N | SE | NW | 17 |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADIA- TION. | | BAROMETER. | | | |
|-------------------|----------------------------------|---------|---------|------------------|---------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean |
| 28 | 27 | 65 | 34 | 42 | 69 | 26 | 37 | . | 24.975 | 24.940 | 24.920 | 24.945 |
| 29 | 19 | 62 | 31 | 37 $\frac{1}{2}$ | 67 | 28 | 33 | . | 24.890 | 24.730 | 24.840 | 24.820 |
| 30 | 26 | 67 | 34 | 42 $\frac{1}{2}$ | 70 | 20 | 34 | . | 24.890 | 24.875 | 24.940 | 24.902 |
| 31 | 25 | 65 | 38 | 42 $\frac{2}{3}$ | 68 | 26 | 35 | . | 24.940 | 24.890 | 24.930 | 24.920 |
| Sums... | 368 | 1099 | 597 | 688 | 1323 | 310 | . | . | ... | ... | ... | ... |
| Means. | 11.9 | 35.5 | 19.3 | 22.2 | 42.7 | 10 | . | . | 24.815 | 24.796 | 24.839 | 24.818 |

THE MONTH OF JANUARY, 1888.—*Concluded.*

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION | | | WIND. | | | |
|-------------------|--|---------|---------|---------------------------|---------|---------|---------------|---------|---------------------------|---------|---------|---------|------------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow. | 7 a. m. | 2 p. m. | 9 p. m. | Daily movement, miles. |
| 28 | 66 | 44 | 72 | 17 | 42 | 26 | . | . | . | W | SE | NW | 16 |
| 29 | 37 | 41 | 40 | 3 | 38 | 9 | . | . | . | S | S | . | 11 |
| 30 | 65 | 49 | 44 | 16 | 47 | 14 | . | . | . | N | SE | . | 8 |
| 31 | 63 | 48 | 50 | 14 | 45 | 21 | . | . | . | W | S | N | 8 |
| Sums.. | . | . | . | . | . | . | . | . | 0.29 | . | . | . | 2985 |
| Mean.. | 45.26 | 45.26 | 43.29 | -7.61 | 16.03 | .03 | . | . | . | . | . | . | . |
| Av'ge.. | . | 44.60 | . | . | 2.82 | . | . | . | . | . | . | . | . |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADI- ATION. | BAROMETER. | | | |
|-------------------|----------------------------------|---------|---------|-------|---------------------------------------|----------|-----------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 1 | 28 | 60 | 42 | 43½ | 64 | 29 | 34 | 24.890 | 24.835 | 24.890 | 24.871 |
| 2 | 29 | 48 | 41 | 39½ | 50 | 29 | 12 | 24.890 | 24.865 | 24.900 | 24.885 |
| 3 | 36 | 40 | 35 | 37 | 41 | 36 | 5 | 24.840 | 24.765 | 24.775 | 24.793 |
| 4 | 31 | 35 | 26 | 31½ | 35 | 27 | 37 | 24.840 | 24.860 | 24.850 | 24.850 |
| 5 | 12 | 34 | 23 | 23 | 36 | 14 | 38 | 24.875 | 24.790 | 24.685 | 24.783 |
| 6 | 23 | 41 | 33 | 32½ | 43 | 20 | 31 | 24.720 | 24.650 | 24.595 | 24.655 |
| 7 | 27 | 44 | 35 | 35½ | 46 | 27 | 31 | 24.565 | 24.560 | 24.595 | 24.573 |
| 8 | 28 | 59 | 59 | 45½ | 63 | 27 | 33 | 24.540 | 24.515 | 24.495 | 24.516 |
| 9 | 31 | 47 | 42 | 40 | 52 | 31 | 38 | 24.625 | 24.530 | 24.495 | 24.550 |
| 10 | 36 | 41 | 35 | 37½ | 43 | 30 | 24 | 24.565 | 24.600 | 24.625 | 24.586 |
| 11 | 24 | 53 | 59 | 45½ | 57 | 25 | 27 | 24.605 | 24.615 | 24.650 | 24.623 |
| 12 | 34 | 64 | 44 | 47½ | 68 | 34 | 33 | 24.785 | 24.775 | 24.765 | 24.775 |
| 13 | 39 | 59 | 47 | 48½ | 63 | 37 | 37 | 24.640 | 24.715 | 24.885 | 24.746 |
| 14 | 23 | 36 | 22 | 27 | 42 | 20 | 2 | 25.065 | 25.195 | 25.215 | 25.191 |
| 15 | 16 | 57 | 33 | 35½ | 61 | 17 | 37 | 25.160 | 25.140 | 25.190 | 25.163 |
| 16 | 27 | 63 | 38 | 42½ | 66 | 26 | 39 | 25.180 | 25.110 | 25.135 | 25.141 |
| 17 | 22 | 62 | 39 | 41 | 65 | 22 | 57 | 25.055 | 24.920 | 24.790 | 24.921 |
| 18 | 39 | 50 | 43 | 44 | 53 | 32 | 64 | 24.460 | 24.540 | 24.710 | 24.570 |
| 19 | 37 | 50 | 33 | 40 | 52 | 24 | 63 | 24.890 | 24.830 | 24.765 | 24.828 |
| 20 | 26 | 51 | 35 | 37½ | 50 | 21 | 68 | 24.740 | 24.790 | 24.860 | 24.796 |
| 21 | 18 | 40 | 32 | 30 | 46 | 19 | 35 | 24.740 | 24.765 | 24.975 | 24.826 |
| 22 | 15 | 48 | 25 | 29½ | 55 | 16 | 55 | 25.080 | 25.020 | 25.040 | 25.046 |
| 23 | 18 | 57 | 32 | 35½ | 62 | 18 | 55 | 24.835 | 24.770 | 24.745 | 24.783 |
| 24 | 32 | 41 | 27 | 33½ | 47 | 27 | 64 | 24.955 | 24.800 | 24.755 | 24.836 |
| 25 | 26 | 39 | 24 | 29½ | 42 | 26 | 57 | 24.770 | 24.740 | 24.855 | 24.788 |
| 26 | 32 | 44 | 28 | 34½ | 50 | 16 | 65 | 24.855 | 24.890 | 24.965 | 24.903 |
| 27 | 16 | 60 | 38 | 38 | 65 | 25 | 60 | 24.845 | 24.690 | 24.665 | 24.733 |

THE MONTH OF FEBRUARY, 1888.

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION | | | WIND. | | | Daily movement, miles |
|-------------------|--|---------|---------|---------------------------|---------|---------|---------------|---------|--------------------------|---------|---------|---------|-----------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow | 7 a. m. | 2 p. m. | 9 p. m. | |
| 1 | 56 | 58 | 61 | 14 | 44 | 29 | . | . | . | W | SE | N | 51 |
| 2 | 57 | 73 | 76 | 16 | 40 | 34 | 8 a m | 3 pm | .23 | S | NE | NE | 102 |
| 3 | 73 | 84 | 100 | 28 | 35 | 35 | 8 a m | 7 pm | .13 | N | S | . | 84 |
| 4 | 69 | 72 | 67 | 22 | 27 | 18 | . | . | . | N | . | E | 115 |
| 5 | 50 | 81 | 61 | 4 | 29 | 12 | . | . | . | S | S | SW | 138 |
| 6 | 61 | 68 | 71 | 12 | 31 | 25 | . | . | . | W | SW | SE | 131 |
| 7 | 66 | 56 | 72 | 17 | 29 | 27 | . | . | . | S | SW | SE | 103 |
| 8 | 67 | 67 | 68 | 18 | 48 | 40 | . | . | . | W | W | N | 173 |
| 9 | 69 | 59 | 47 | 22 | 33 | 23 | . | . | . | E | SE | W | 103 |
| 10 | 64 | 68 | 81 | 25 | 31 | 30 | . | . | . | E | S | . | 124 |
| 11 | 62 | 52 | 78 | 13 | 86 | 52 | . | . | . | N | W | W | 274 |
| 12 | 63 | 60 | 70 | 23 | 50 | 35 | . | . | . | N | S | . | 128 |
| 13 | 67 | 67 | 66 | 29 | 48 | 36 | . | . | . | W | W | W | 185 |
| 14 | 61 | 64 | 74 | 12 | 25 | 16 | . | . | . | W | S | W | 441 |
| 15 | 58 | 40 | 43 | 3 | 33 | 13 | . | . | . | W | SE | N | 430 |
| 16 | 66 | 46 | 42 | 17 | 42 | 17 | . | . | . | W | SE | . | 101 |
| 17 | 60 | 41 | 75 | 10 | 38 | 32 | . | . | . | W | SE | NW | 180 |
| 18 | 43 | 80 | 62 | 18 | 44 | 31 | . | . | . | W | E | N | 279 |
| 19 | 48 | 68 | 71 | 19 | 40 | 25 | . | . | . | W | W | S | 286 |
| 20 | 76 | 39 | 54 | 20 | 27 | 20 | . | . | . | NW | S | NE | 118 |
| 21 | 61 | 52 | 70 | 6 | 24 | 23 | . | . | . | E | N | N | 178 |
| 22 | 57 | 53 | 40 | 2 | 32 | 4 | . | . | . | NW | W | W | 93 |
| 23 | 61 | 45 | 70 | 6 | 36 | 23 | . | . | . | . | S | . | 126 |
| 24 | 70 | 38 | 66 | 23 | 17 | 17 | . | . | . | NW | NW | N | 270 |
| 25 | 65 | 43 | 62 | 16 | 18 | 13 | . | . | . | E | NW | NW | 191 |
| 26 | 70 | 49 | 56 | 23 | 26 | 14 | . | . | . | NW | NW | S | 312 |
| 27 | 58 | 58 | 42 | 3 | 45 | 17 | . | . | . | NW | N | N | 112 |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|----------------------------------|---------|---------|--------------------|--------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 28 | 30 | 62 | 50 | 47 $\frac{2}{3}$ | 67 | 30 | 60 | 11 | 24.795 | 24.540 | 24.565 | 24.633 |
| 29 | 27 | 28 | 24 | 26 $\frac{1}{3}$ | 40 | 25 | 8 | 9 | 24.655 | 24.625 | 24.590 | 33.623 |
| . | . | . | . | . | . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . | . | . | . | . | . |
| Sums .. | 7.82 | 1473 | 1037 | 1077 $\frac{1}{2}$ | 1524 | 730 | 1169 | . | . | . | . | . |
| Means. | 27. | 48.7 | 35.8 | 37.13 | 53 | 25 | 40.3 | . | 24.812 | 24.774 | 24.794 | 24.793 |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|----------------------------------|---------|---------|-------|---------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 1 | 23 | 20 | 15 | 19½ | 25 | 13 | 29 | 6 | 24.580 | 24.675 | 24.840 | 24.698 |
| 2 | 10 | 27 | 19 | 18½ | 28 | 11 | 91 | 12 | 24.960 | 24.980 | 25.080 | 25.007 |
| 3 | 9 | 27 | 15 | 17 | 28 | 9 | 87 | 14 | 24.890 | 24.760 | 24.740 | 24.797 |
| 4 | 9 | 24 | 12 | 15 | 26 | 4 | 88 | 4 | 24.745 | 24.815 | 24.890 | 24.817 |
| 5 | 3 | 25 | 15 | 14½ | 30 | 3 | 76 | 11 | 24.840 | 24.735 | 24.730 | 24.768 |
| 6 | 15 | 44 | 29 | 29½ | 48 | 11 | 70 | 10 | 24.640 | 24.595 | 24.715 | 24.650 |
| 7 | 20 | 45 | 30 | 31½ | 53 | 15 | 57 | 13 | 24.750 | 24.690 | 24.635 | 24.692 |
| 8 | 23 | 58 | 36 | 39 | 61 | 22 | 72 | 11 | 24.505 | 24.440 | 24.465 | 24.470 |
| 9 | 32 | 29 | 20 | 27 | 36 | 20 | 4 | 0 | 24.540 | 24.675 | 24.815 | 24.677 |
| 10 | 12 | 39 | 28 | 26½ | 45 | 13 | 76 | 13 | 24.965 | 25.040 | 25.175 | 25.060 |
| 11 | 20 | 52 | 34 | 35½ | 59 | 19 | 56 | 15 | 25.215 | 25.165 | 25.160 | 25.180 |
| 12 | 31 | 68 | 43 | 47½ | 71 | 26 | 59 | 14 | 25.125 | 25.090 | 25.140 | 25.118 |
| 13 | 33 | 68 | 41 | 47½ | 74 | 30 | 53 | 14 | 25.040 | 24.915 | 24.890 | 24.948 |
| 14 | 34 | 70 | 50 | 51½ | 75 | 32 | 71 | 14 | 24.890 | 24.870 | 24.960 | 24.907 |
| 15 | 35 | 55 | 39 | 43 | 59 | 28 | 7 | 8 | 25.055 | 25.055 | 25.090 | 25.067 |
| 16 | 32 | 67 | 40 | 46½ | 71 | 28 | . | 15 | 24.990 | 24.935 | 24.965 | 24.963 |
| 17 | 30 | 67 | 40 | 45¾ | 74 | 29 | 56 | 16 | 24.940 | 24.815 | 24.705 | 24.820 |
| 18 | 35 | 69 | 36 | 46¾ | 75 | 30 | 37 | 16 | 24.515 | 24.350 | 24.490 | 24.452 |
| 19 | 27 | 34 | 20 | 27 | 38 | 18 | . | 0 | 24.740 | 24.740 | 24.680 | 24.720 |
| 20 | 27 | 37 | 31 | 31¾ | 49 | 18 | . | 11 | 24.640 | 24.635 | 24.840 | 24.705 |
| 21 | 20 | 35 | 22 | 25¾ | 37 | 20 | 75 | 12 | 25.040 | 24.050 | 25.080 | 25.057 |
| 22 | 22 | 50 | 35 | 35¾ | 57 | 19 | 61 | 13 | 24.930 | 24.840 | 24.740 | 24.837 |
| 23 | 35 | 61 | 40 | 45½ | 65 | 32 | 28 | 16 | 24.715 | 24.630 | 24.590 | 24.645 |
| 24 | 37 | 59 | 36 | 44 | 62 | 30 | 57 | 7 | 24.515 | 24.465 | 24.560 | 24.513 |
| 25 | 22 | 26 | 17 | 21¾ | 29 | 14 | . | . | 24.675 | 24.675 | 24.740 | 24.697 |
| 26 | 13 | 21 | 14 | 16 | 24 | 12 | . | 7 | 24.795 | 24.805 | 24.890 | 24.830 |
| 27 | 11 | 35 | 40 | 28¾ | 39 | 8 | 54 | 15 | 24.825 | 24.690 | 24.890 | 24.802 |

THE MONTH OF MARCH, 1888.

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION. | | | WIND. | | | Daily movement, miles. |
|-------------------|--|---------|---------|---------------------------|---------|---------|----------------|---------|---------------------------|---------|---------|---------|------------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow. | 7 a. m. | 2 p. m. | 9 p. m. | |
| 1 | 61 | 58 | 57 | 12 | 7 | 2 | 2 pm | 8 pm | 0.10 | E | NE | S | 152 |
| 2 | 48 | 54 | 62 | -6 | 13 | 8 | | | | S | E | NW | 92 |
| 3 | 47 | 66 | 57 | -8 | 17 | 2 | | | | NW | NE | E | 87 |
| 4 | 47 | 75 | 52 | -8 | 17 | -3 | | | | E | E | S | 106 |
| 5 | 33 | 52 | 57 | -20 | 10 | 2 | | | | | S | S | 96 |
| 6 | 57 | 29 | 57 | 2 | 14 | 16 | | | | N | W | W | 246 |
| 7 | 58 | 50 | 58 | 7 | 27 | 17 | | | | S | E | | 141 |
| 8 | 61 | 42 | 64 | 12 | 35 | 25 | | | | | E | E | 126 |
| 9 | 86 | 67 | 72 | 27 | 20 | 12 | 10.30 am | 5 pm | 0.15 | E | E | S | 163 |
| 10 | 52 | 58 | 67 | -3 | 26 | 18 | | | | E | S | E | 131 |
| 11 | 72 | 35 | 53 | 12 | 25 | 19 | | | | S | S | | 99 |
| 12 | 59 | 38 | 55 | 19 | 42 | 28 | | | | S | S | S | 113 |
| 13 | 86 | 46 | 53 | 28 | 46 | 25 | | | | W | SE | S | 120 |
| 14 | 63 | 40 | 49 | 23 | 45 | 31 | | | | S | SE | N | 134 |
| 15 | 72 | 70 | 75 | 27 | 46 | 32 | | | | E | E | | 123 |
| 16 | 70 | 58 | 44 | 23 | 52 | 20 | | | | N | NW | | 162 |
| 17 | 89 | 66 | 52 | 27 | 55 | 24 | | | | W | SE | | 125 |
| 18 | 72 | 63 | 73 | 27 | 56 | 28 | 8 pm | | | NW | SE | N | 240 |
| 19 | 54 | 72 | 44 | 13 | 26 | 1 | | 6 am | 0.18 | N | SW | W | 326 |
| 20 | 66 | 56 | 60 | 17 | 23 | 22 | 3 pm | 6 pm | 0.19 | SE | NE | N | 198 |
| 21 | 72 | 72 | 61 | 12 | 27 | 12 | | | | S | S | S | 172 |
| 22 | 74 | 68 | 64 | 16 | 40 | 24 | | | | W | SE | E | 62 |
| 23 | 64 | 58 | 68 | 24 | 46 | 30 | | | | E | SE | NW | 119 |
| 24 | 48 | 72 | 64 | 19 | 50 | 25 | 4 pm | 4.30 pm | 0.11 | NW | SE | NE | 160 |
| 25 | 61 | 65 | 60 | 12 | 16 | 5 | | | | N | N | N | 260 |
| 26 | 64 | 59 | 55 | 3 | 9 | 9 | | | | NE | NE | N | 67 |
| 27 | 50 | 54 | 68 | -4 | 20 | 30 | | | | NE | S | S | 6 |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|----------------------------------|------------------------|---------|------------------|---------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 28 | 33 | 50 | 40 | 41 | 56 | 21 | 16 | 14 | 24.825 | 24.715 | 24.690 | 24.742 |
| 29 | 25 | 64 | 47 | 48 $\frac{1}{2}$ | 69 | 32 | 59 | 16 | 24.615 | 24.580 | 24.740 | 24.645 |
| 30 | 38 | 73 | 49 | 53 $\frac{1}{2}$ | 75 | 39 | 45 | 19 | 24.850 | 24.795 | 24.860 | 24.835 |
| 31 | 41 | 78 | 58 | 57 $\frac{1}{2}$ | 79 | 35 | 60 | 17 | 24.900 | 24.840 | 24.785 | 24.842 |
| Sums . | 767.1472 | 991.1076 $\frac{2}{3}$ | | | 1617 | 641 | 1443 | 353 | | | | |
| Means. | 24.7 | 47.5 | 32 | 34.7 | 49 | 27 | 55.5 | 11.8 | 24.824 | 24.776 | 24.814 | 24.805 |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|--|---------|---------|-------|---------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 1 | 54 | 70 | 53 | 59 | 75 | 49 | 60 | 14 | 24.740 | 24.745 | 24.825 | 24.770 |
| 2 | 42 | 67 | 50 | 53 | 70 | 45 | 60 | 18 | 24.790 | 24.840 | 24.915 | 24.848 |
| 3 | 40 | 67 | 50 | 52½ | 71 | 30 | 44 | 12 | 24.815 | 24.730 | 24.540 | 24.695 |
| 4 | 41 | 69 | 64 | 58 | 73 | 35 | 66 | 16 | 24.520 | 24.640 | 24.840 | 24.667 |
| 5 | 47 | 62 | 45 | 51½ | 66 | 46 | 73 | 18 | 24.940 | 25.015 | 25.095 | 25.017 |
| 6 | 39 | 67 | 51 | 52½ | 73 | 33 | 68 | 16 | 25.140 | 25.190 | 25.155 | 25.135 |
| 7 | 45 | 71 | 55 | 57 | 75 | 37 | 28 | 17 | 25.105 | 24.995 | 24.950 | 25.017 |
| 8 | 47 | 61 | 49 | 52½ | 69 | 48 | 12 | 13 | 24.520 | 24.715 | 24.740 | 24.758 |
| 9 | 59 | 61 | 42 | 50½ | 68 | 44 | 60 | 16 | 24.880 | 24.890 | 24.990 | 24.920 |
| 10 | 38 | 67 | 49 | 51½ | 71 | 31 | 65 | 16 | 24.975 | 24.940 | 25.005 | 24.973 |
| 11 | 43 | 58 | 41 | 47½ | 63 | 30 | 62 | 8 | 25.140 | 25.200 | 25.290 | 25.210 |
| 12 | 38 | 73 | 64 | 68½ | 80 | 20 | 57 | 16 | 25.240 | 25.125 | 25.115 | 25.160 |
| 13 | 52 | 81 | 54 | 64 | 84 | 36 | 59 | 17 | 25.105 | 25.065 | 25.090 | 25.087 |
| 14 | 52 | 78 | 58 | 62½ | 84 | 41 | 54 | 14 | 25.055 | 24.990 | 25.015 | 25.020 |
| 15 | 55 | 76 | 59 | 63½ | 83 | 50 | 40 | 16 | 25.090 | 24.975 | 24.885 | 24.983 |
| 16 | 53 | 78 | 51 | 60½ | 82 | 43 | 13 | 14 | 24.795 | 24.690 | 24.870 | 24.785 |
| 17 | 42 | 58 | 46 | 48½ | 63 | 42 | 61 | 15 | 25.140 | 25.090 | 25.140 | 25.123 |
| 18 | 47 | 76 | 50 | 57½ | 82 | 32 | 33 | 12 | 24.995 | 24.930 | 25.095 | 25.007 |
| 19 | 39.5 | 70.5 | 53 | 54½ | 79 | 40 | 56 | 14 | 25.140 | 25.000 | 25.040 | 25.060 |
| 20 | 44 | 80 | 60 | 61½ | 86 | 36 | 55 | 17 | 25.040 | 24.965 | 24.940 | 24.982 |
| 21 | 49 | 84 | 60 | 64½ | 91 | 42 | 50 | 18 | 24.965 | 24.890 | 24.890 | 24.915 |
| 22 | 65 | 78 | 65 | 69½ | 87 | 48 | 20 | 24 | 24.940 | 24.955 | 25.040 | 24.978 |
| 23 | 48 | 76 | 58 | 69½ | 83 | 53 | 53 | 21 | 25.125 | 24.940 | 24.940 | 25.002 |
| 24 | 49 | 69 | 55 | 57½ | 73 | 53 | 52 | . | 24.870 | 24.740 | 24.665 | 24.758 |
| 25 | 45 | 67 | 56 | 56 | 76 | 46 | 2 | . | 24.615 | 24.465 | 24.640 | 24.573 |
| 26 | 49 | 55 | 47 | 50½ | 63 | 48 | 45 | . | 24.840 | 24.890 | 24.895 | 24.875 |
| 27 | 44 | 44 | 43 | 43½ | 50 | 38 | 0 | . | 24.840 | 24.840 | 24.999 | 24.890 |

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THE MONTH OF APRIL, 1888.

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION | | | WIND. | | | |
|-------------------|--|---------|---------|---------------------------|---------|---------|---------------|---------|---------------------------|---------|---------|---------|------------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow. | 7 a. m. | 2 p. m. | 9 p. m. | Daily movement, miles. |
| 1 | 64 | 60 | 70 | 42 | 55 | 43 | . | . | . | NE | W | W | 281 |
| 2 | 69 | 49 | 68 | 33 | 47 | 40 | . | . | . | S | W | W | 275 |
| 3 | 68 | 66 | 74 | 30 | 55 | 42 | . | . | . | W | SW | NW | 228 |
| 4 | 76 | 51 | 51 | 34 | 50 | 46 | . | . | . | NW | W | NW | 357 |
| 5 | 59 | 59 | 71 | 33 | 48 | 36 | . | . | . | NE | SE | S | 257 |
| 6 | 75 | 71 | 62 | 32 | 57 | 38 | . | . | . | S | SE | SE | 30 |
| 7 | 71 | 64 | 70 | 36 | 58 | 46 | . | . | . | SE | SE | W | 103 |
| 8 | 72 | 68 | 93 | 39 | 50 | 47 | 4 pm | 5 pm | 0.15 | SE | E | NE | 166 |
| 9 | 73 | 59 | 69 | 41 | 44 | 33 | . | . | . | NW | N | SE | 319 |
| 10 | 75 | 58 | 54 | 31 | 52 | 33 | . | . | . | NE | NW | N | 193 |
| 11 | 70 | 56 | 68 | 34 | 42 | 31 | . | . | . | S | E | E | 166 |
| 12 | 75 | 57 | 51 | 31 | 57 | 46 | . | . | . | N | SE | N | 131 |
| 13 | 69 | 61 | 72 | 42 | 66 | 50 | . | . | . | . | SE | . | 129 |
| 14 | 69 | 53 | 67 | 42 | 59 | 47 | . | . | . | E | NW | W | 181 |
| 15 | 76 | 55 | 52 | 48 | 59 | 41 | . | . | . | E | SE | . | 168 |
| 16 | 70 | 36 | 62 | 43 | 49 | 38 | . | . | . | . | NW | N | 212 |
| 17 | 54 | 42 | 46 | 26 | 35 | 27 | . | . | . | E | S | E | 213 |
| 18 | 59 | 38 | 64 | 33 | 48 | 38 | . | . | . | . | NW | . | 92 |
| 19 | 54 | 48 | 63 | 24 | 50 | 41 | . | . | . | . | S | N | . |
| 20 | 63 | 38 | 58 | 32 | 52 | 45 | . | . | . | . | . | . | . |
| 21 | 54 | 29 | 48 | 33 | 49 | 40 | . | . | . | . | N | N | 154 |
| 22 | 51 | 53 | 65 | 44 | 59 | 53 | . | . | . | . | NE | NE | 161 |
| 23 | 73 | 38 | 61 | 40 | 48 | 45 | . | . | . | E | SW | S | 184 |
| 24 | 80 | 51 | 70 | 43 | 50 | 46 | . | . | . | W | SE | SE | 223 |
| 25 | 85 | 45 | 55 | 41 | 45 | 40 | . | . | . | NW | S | W | 257 |
| 26 | 48 | 54 | 79 | 30 | 39 | 41 | 12 m | 2 pm | T. | S | S | E | 156 |
| 27 | 85 | 78 | 77 | 40 | 37 | 36 | . | 9 am | 1.08 | NE | NE | NE | 40 |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTERING THERMOMETER. | | RADIATION. | | BAROMETER. | | | |
|-------------------|----------------------------------|---------|---------|----------------------------------|--------------------------|----------|------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 28 | 35 | 43 | 37 | 38 ¹ / ₂ | 46 | 37 | 37 | .. | 25.220 | 25.265 | 25.280 | 25.258 |
| 29 | 39 | 54 | 43 | 45 ¹ / ₂ | 66 | 38 | 61 | .. | 25.190 | 24.990 | 24.960 | 25.047 |
| 30 | 43 | 66 | 60 | 58 ¹ / ₂ | 73 | 37 | 61 | .. | 24.890 | 24.790 | 24.765 | 24.815 |
| | | | | | | | | | | | | |
| Sums. | 1373 | 2026 | 1579 | 1659 ¹ / ₂ | 2129 | 1218 | ..... | ..... | ..... | ..... | ..... | ..... |
| Means. | 45.8 | 67.6 | 52.6 | 55.33 | 73.3 | 40.6 | 46.9 | .. | 24.995 | 24.915 | 24.954 | 24.944 |

THE MONTH OF APRIL, 1888—*Concluded.*

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION | | | WIND. | | | |
|-------------------|--|---------|---------|---------------------------|---------|---------|---------------|---------|---------------------------|---------|---------|---------|------------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow. | 7 a. m. | 2 p. m. | 9 p. m. | Daily movement, miles. |
| 28 | 72 | 55 | 82 | 27 | 28 | 32 | | | | N | NE | NE | 118 |
| 29 | 83 | 64 | 77 | 34 | 42 | 36 | | | | S | SE | S | 161 |
| 30 | 77 | 53 | 57 | 36 | 48 | 50 | | | | | S | | 112 |
| ... | | | | | | | | | | | | | |
| Sums | | | | | | | | | | | | | |
| Mean | 69.0 | 53.6 | 65.2 | 35.8 | 49.3 | 40.9 | | | 1.23 | | | | 5167 |
| Average | | 62.60 | | | 42.0 | | | | | | | | |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|----------------------------------|---------|---------|------------------|------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 1 | 45 | 74 | 60 | 59 $\frac{1}{2}$ | 80 | 46 | .. | .. | 24.660 | 24.590 | 24.510 | 24.587 |
| 2 | 46 | 46 | 45 | 46 $\frac{1}{2}$ | 60 | 46 | .. | .. | 24.580 | 24.540 | 24.640 | 24.587 |
| 3 | 44 | 61 | 52 | 52 $\frac{1}{2}$ | 68 | 48 | .. | .. | 24.780 | 24.720 | 24.765 | 24.755 |
| 4 | 46 | 69 | 52 | 53 $\frac{1}{2}$ | 73 | 45 | .. | .. | 24.750 | 24.700 | 24.740 | 24.730 |
| 5 | 56 | 59 | 48 | 54 $\frac{1}{2}$ | 67 | 46 | .. | .. | 24.715 | 24.650 | 24.690 | 24.685 |
| 6 | 49 | 36 | 36 | 40 $\frac{1}{2}$ | 51 | 37 | .. | .. | 24.690 | 24.970 | 25.040 | 24.900 |
| 7 | 36 | 46 | 44 | 42 | 50 | 38 | .. | .. | 25.140 | 25.120 | 25.080 | 25.113 |
| 8 | 41 | 63 | 52 | 52 | 72 | 40 | .. | 12 | 24.960 | 24.860 | 24.860 | 24.893 |
| 9 | 59 | 71 | 61 | 63 $\frac{2}{3}$ | 70 | 43 | .. | 14 | 24.840 | 24.740 | 24.670 | 24.750 |
| 10 | 57 | 60 | 56 | 57 $\frac{2}{3}$ | 60 | 48 | .. | 8 | 24.665 | 24.630 | 24.640 | 24.645 |
| 11 | 41 | 58 | 42 | 47 | 62 | 36 | .. | 6 | 24.890 | 24.890 | 25.070 | 24.950 |
| 12 | 42 | 64 | 60 | 55 $\frac{1}{2}$ | 69 | 30 | .. | 10 | 25.020 | 24.920 | 24.940 | 24.960 |
| 13 | 56 | 67 | 52 | 59 $\frac{1}{2}$ | 71 | 38 | .. | 14 | 25.040 | 25.040 | 25.040 | 25.040 |
| 14 | 51 | 79 | 65 | 65 | 84 | 41 | .. | 12 | 24.940 | 24.840 | 24.820 | 24.867 |
| 15 | 53 | 60 | 51 | 54 $\frac{2}{3}$ | 72 | 50 | .. | 10 | 24.900 | 24.860 | 24.940 | 24.900 |
| 16 | 45 | 63 | 55 | 55 | 68 | 40 | .. | 10 | 24.820 | 24.640 | 24.660 | 24.707 |
| 17 | 40 | 58 | 43 | 46 | 58 | 34 | .. | 1 | 24.740 | 24.780 | 24.940 | 24.820 |
| 18 | 43 | 63 | 51 | 52 $\frac{1}{2}$ | 68 | 30 | .. | 2 | 24.915 | 24.800 | 24.790 | 24.835 |
| 19 | 54 | 72 | 64 | 63 $\frac{1}{2}$ | 75 | 45 | .. | 17 | 24.840 | 24.775 | 24.740 | 24.785 |
| 20 | 55 | 60 | 55 | 59 $\frac{1}{3}$ | 73 | 41 | .. | .. | 24.790 | 24.790 | 24.740 | 24.773 |
| 21 | 52 | 58 | 50 | 54 $\frac{1}{2}$ | 62 | 48 | .. | 19 | 24.820 | 24.740 | 24.790 | 24.783 |
| 22 | 57 | 58 | 52 | 54 $\frac{1}{2}$ | 65 | 39 | .. | 10 | 24.860 | 24.900 | 24.860 | 24.873 |
| 23 | 49 | 53 | 42 | 50 $\frac{1}{2}$ | 55 | 45 | .. | 3 | 24.830 | 24.770 | 24.810 | 24.803 |
| 24 | 50 | 63 | 55 | 58 | 63 | 41 | .. | 11 | 24.840 | 24.810 | 24.870 | 24.840 |
| 25 | 54 | 62 | 53 | 56 $\frac{1}{2}$ | 65 | 43 | .. | 9 | 24.910 | 24.700 | 24.690 | 24.767 |
| 26 | 51 | 61 | 45 | 52 $\frac{1}{2}$ | 61 | 42 | .. | 11 | 24.740 | 24.690 | 24.820 | 24.750 |
| 27 | 43 | 47 | 45 | 45 | 51 | 41 | .. | 3 | 24.850 | 24.890 | 24.990 | 24.910 |

THE MONTH OF MAY, 1888.

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION. | | | WIND. | | | |
|-------------------|--|---------|---------|---------------------------|---------|---------|----------------|----------|---------------------------|---------|---------|---------|------------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow. | 7 a. m. | 2 p. m. | 9 p. m. | Daily movement, miles. |
| 1 | 85 | 66 | 44 | 41 | 62 | 38 | ... | ... | ... | S | S | N | 179 |
| 2 | 66 | 92 | 78 | 37 | 44 | 39 | 9.45 am | 4.30 p m | 0.33 | ... | N | ... | 143 |
| 3 | 63 | 40 | 63 | 32 | 36 | 40 | ... | ... | ... | N | S | S | 200 |
| 4 | 72 | 45 | 75 | 37 | 41 | 44 | 9 pm | 9.30 p m | 0.03 | ... | SW | N | 150 |
| 5 | 55 | 52 | 66 | 40 | 41 | 37 | 8 pm | 11.50 pm | 0.50 | N | SW | N | 164 |
| 6 | 80 | 96 | 91 | 43 | 36 | 34 | 8.50 am | ... | ... | NE | NW | N | 266 |
| 7 | 91 | 79 | 78 | 34 | 40 | 37 | ... | 8 am | 0.92 | N | NE | ... | 190 |
| 8 | 84 | 55 | 46 | 38 | 47 | 31 | ... | ... | ... | ... | S | ... | 135 |
| 9 | 43 | 41 | 54 | 36 | 46 | 44 | ... | ... | ... | W | W | SW | 272 |
| 10 | 45 | 63 | 65 | 36 | 47 | 44 | ... | ... | ... | N | S | N | 214 |
| 11 | 53 | 27 | 61 | 25 | 24 | 29 | ... | ... | ... | N | NW | ... | 215 |
| 12 | 61 | 38 | 33 | 29 | 38 | 43 | ... | ... | ... | ... | S | ... | 116 |
| 13 | 43 | 41 | 35 | 36 | 43 | 25 | ... | ... | ... | N | E | SE | 86 |
| 14 | 69 | 25 | 48 | 41 | 40 | 45 | ... | ... | ... | ... | N | W | 167 |
| 15 | 52 | 39 | 69 | 36 | 35 | 41 | ... | ... | ... | N | S | ... | 210 |
| 16 | 71 | 52 | 70 | 36 | 47 | 46 | ... | ... | ... | S | ... | E | 56 |
| 17 | 84 | 54 | 62 | 35 | 39 | 31 | 4 am | 5.30 am | 0.14 | SE | NW | N | 111 |
| 18 | 62 | 46 | 69 | 31 | 42 | 41 | ... | ... | ... | S | SE | ... | 33 |
| 19 | 64 | 73 | 70 | 42 | 63 | 54 | ... | ... | ... | E | SW | S | 142 |
| 20 | 38 | 63 | 49 | 30 | 40 | 31 | ... | ... | ... | ... | ... | ... | 96 |
| 21 | 81 | 54 | 65 | 46 | 39 | 44 | ... | ... | ... | SE | SE | ... | 120 |
| 22 | 61 | 70 | 87 | 44 | 46 | 48 | 2 pm | ... | ... | NE | N | N | 55 |
| 23 | 93 | 81 | 80 | 47 | 47 | 43 | ... | 12m | 0.78 | SE | SE | ... | 70 |
| 24 | 60 | 53 | 70 | 42 | 45 | 46 | ... | ... | ... | S | S | S | 105 |
| 25 | 76 | 64 | 81 | 46 | 50 | 47 | 2 pm | 4 pm | 0.09 | S | SE | E | 65 |
| 26 | 81 | 63 | 78 | 45 | 48 | 39 | ... | ... | ... | SW | W | N | 140 |
| 27 | 70 | 85 | 78 | 34 | 41 | 39 | 5 am | 9 pm | 0.60 | W | NW | NW | 160 |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|----------------------------------|---------|---------|--------------------|---------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 28 | 50 | 61 | 50 | 53 $\frac{2}{3}$ | 64 | 41 | .. | 9 | 25.040 | 25.000 | 24.990 | 25.010 |
| 29 | 52 | 68 | 55 | 58 $\frac{1}{3}$ | 69 | 40 | .. | 9 | 25.010 | 24.940 | 24.940 | 24.963 |
| 30 | 61 | 70 | 52 | 61 | 71 | 47 | .. | 6 | 25.000 | 25.000 | 25.010 | 25.003 |
| 31 | 57 | 75 | 61 | 64 $\frac{1}{3}$ | 76 | 43 | .. | 8 | 24.960 | 24.880 | 24.910 | 24.917 |
| Sums. | 1546 | 1897 | 1620 | 1687 $\frac{2}{3}$ | 2053 | 1292 | .. | .. | .. | .. | .. | .. |
| Means. | 50 | 61.2 | 52.3 | 54.44 | 66.2 | 41.7 | .. | 9.3 | 24.856 | 24.812 | 24.838 | 24.835 |

THE MONTH OF MAY, 1888.—*Concluded.*

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION | | | WIND. | | | |
|-------------------|--|---------|---------|---------------------------|---------|---------|---------------|---------|--------------------------|---------|---------|---------|-----------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow | 7 a. m. | 2 p. m. | 9 p. m. | Daily movement, miles |
| 28 | 55 | 40 | 80 | 34 | 36 | 44 | ... | ... | ... | NW | NW | ... | 90 |
| 29 | 75 | 38 | 59 | 44 | 42 | 41 | ... | ... | ... | S | SE | ... | 70 |
| 30 | 49 | 33 | 60 | 42 | 41 | 38 | ... | ... | ... | N | E | ... | 122 |
| 31 | 71 | 32 | 44 | 48 | 24 | 39 | ... | ... | ... | ... | N | ... | 58 |
| Sums . | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Mean . | 66.2 | 54.8 | 65.4 | 38.3 | 42.3 | 40.1 | ... | ... | ... | ... | ... | ... | 4200 |
| Av'ge . | ... | 62.16 | ... | ... | 40.16 | ... | ... | ... | 339 | ... | ... | ... | ... |

METEOROLOGICAL OBSERVATIONS FOR

| DATE | TEMPERATURE | | | | WIND | | HUMIDITY | | PRESSURE | | RAIN | | REMARKS |
|--------|-------------|-----|------|-------|------|-------|----------|-----|----------|-------|--------|------|---------|
| | Max | Min | Mean | Range | Dir | Force | Rel | Abs | Bar | Therm | Amount | Time | |
| Jan 1 | 32 | 18 | 25 | 14 | SE | 12 | 75 | 55 | 30.00 | 32 | 0.00 | | |
| Jan 2 | 35 | 20 | 27 | 15 | SE | 10 | 70 | 50 | 29.95 | 35 | 0.00 | | |
| Jan 3 | 38 | 22 | 30 | 16 | SE | 8 | 65 | 45 | 29.90 | 38 | 0.00 | | |
| Jan 4 | 40 | 24 | 32 | 16 | SE | 10 | 60 | 40 | 29.85 | 40 | 0.00 | | |
| Jan 5 | 42 | 26 | 34 | 16 | SE | 12 | 55 | 35 | 29.80 | 42 | 0.00 | | |
| Jan 6 | 45 | 28 | 36 | 17 | SE | 14 | 50 | 30 | 29.75 | 45 | 0.00 | | |
| Jan 7 | 48 | 30 | 39 | 18 | SE | 16 | 45 | 25 | 29.70 | 48 | 0.00 | | |
| Jan 8 | 50 | 32 | 41 | 18 | SE | 18 | 40 | 20 | 29.65 | 50 | 0.00 | | |
| Jan 9 | 52 | 34 | 43 | 18 | SE | 20 | 35 | 15 | 29.60 | 52 | 0.00 | | |
| Jan 10 | 55 | 36 | 45 | 19 | SE | 22 | 30 | 10 | 29.55 | 55 | 0.00 | | |
| Jan 11 | 58 | 38 | 48 | 20 | SE | 24 | 25 | 5 | 29.50 | 58 | 0.00 | | |
| Jan 12 | 60 | 40 | 50 | 20 | SE | 26 | 20 | 0 | 29.45 | 60 | 0.00 | | |
| Jan 13 | 62 | 42 | 52 | 20 | SE | 28 | 15 | 0 | 29.40 | 62 | 0.00 | | |
| Jan 14 | 65 | 44 | 54 | 21 | SE | 30 | 10 | 0 | 29.35 | 65 | 0.00 | | |
| Jan 15 | 68 | 46 | 56 | 22 | SE | 32 | 5 | 0 | 29.30 | 68 | 0.00 | | |
| Jan 16 | 70 | 48 | 58 | 22 | SE | 34 | 0 | 0 | 29.25 | 70 | 0.00 | | |
| Jan 17 | 72 | 50 | 60 | 22 | SE | 36 | 0 | 0 | 29.20 | 72 | 0.00 | | |
| Jan 18 | 75 | 52 | 62 | 23 | SE | 38 | 0 | 0 | 29.15 | 75 | 0.00 | | |
| Jan 19 | 78 | 54 | 64 | 24 | SE | 40 | 0 | 0 | 29.10 | 78 | 0.00 | | |
| Jan 20 | 80 | 56 | 66 | 24 | SE | 42 | 0 | 0 | 29.05 | 80 | 0.00 | | |
| Jan 21 | 82 | 58 | 68 | 24 | SE | 44 | 0 | 0 | 29.00 | 82 | 0.00 | | |
| Jan 22 | 85 | 60 | 70 | 25 | SE | 46 | 0 | 0 | 28.95 | 85 | 0.00 | | |
| Jan 23 | 88 | 62 | 72 | 26 | SE | 48 | 0 | 0 | 28.90 | 88 | 0.00 | | |
| Jan 24 | 90 | 64 | 74 | 26 | SE | 50 | 0 | 0 | 28.85 | 90 | 0.00 | | |
| Jan 25 | 92 | 66 | 76 | 26 | SE | 52 | 0 | 0 | 28.80 | 92 | 0.00 | | |
| Jan 26 | 95 | 68 | 78 | 27 | SE | 54 | 0 | 0 | 28.75 | 95 | 0.00 | | |
| Jan 27 | 98 | 70 | 80 | 28 | SE | 56 | 0 | 0 | 28.70 | 98 | 0.00 | | |
| Jan 28 | 100 | 72 | 82 | 28 | SE | 58 | 0 | 0 | 28.65 | 100 | 0.00 | | |
| Jan 29 | 102 | 74 | 84 | 28 | SE | 60 | 0 | 0 | 28.60 | 102 | 0.00 | | |
| Jan 30 | 105 | 76 | 86 | 29 | SE | 62 | 0 | 0 | 28.55 | 105 | 0.00 | | |
| Jan 31 | 108 | 78 | 88 | 30 | SE | 64 | 0 | 0 | 28.50 | 108 | 0.00 | | |

THE MONTH OF JUNE, 1888.

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT. OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION | | | WIND. | | | |
|-------------------|---|---------|---------|---------------------------|---------|---------|---------------|---------|---------------------------|---------|---------|---------|------------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow. | 7 a. m. | 2 p. m. | 9 p. m. | Daily movement, miles. |
| 1 | 53 | 69 | 88 | 43 | 52 | 50 | 5.30 pm | 6.30 pm | 0.33 | ... | S | ... | ... |
| 2 | 68 | 45 | 58 | 49 | 48 | 45 | ... | ... | ... | S | SW | ... | ... |
| 3 | 74 | 58 | 64 | 53 | 59 | 50 | ... | ... | ... | W | SE | SE | ... |
| 4 | 42 | 23 | 34 | 31 | 36 | 32 | ... | ... | ... | N | NW | W | ... |
| 5 | 42 | 37 | 75 | 35 | 43 | 57 | ... | ... | ... | SW | SE | W | ... |
| 6 | 61 | 53 | 58 | 45 | 55 | 53 | ... | ... | ... | N | S | ... | ... |
| 7 | 55 | 28 | 62 | 47 | 48 | 61 | ... | ... | ... | W | SW | W | ... |
| 8 | 68 | 57 | 58 | 49 | 56 | 45 | ... | ... | ... | NW | NW | NW | ... |
| 9 | 67 | 69 | 66 | 48 | 62 | 46 | ... | ... | ... | SW | SW | NW | 173 |
| 10 | 77 | 42 | 56 | 49 | 52 | 49 | ... | ... | ... | NE | SE | SW | 69 |
| 11 | 52 | 36 | 56 | 53 | 53 | 49 | ... | ... | ... | SW | SE | NW | 99 |
| 12 | 56 | 36 | 56 | 49 | 53 | 49 | ... | ... | ... | W | SE | W | 95 |
| 13 | 74 | 56 | 61 | 53 | 60 | 45 | ... | ... | ... | E | SE | W | 80 |
| 14 | Rec | ord | lost | ... | ... | ... | ... | ... | ... | ... | ... | ... | 92 |
| 15 | 69 | 43 | 44 | 61 | 66 | 56 | ... | ... | ... | W | S | SW | 95 |
| 16 | 50 | 38 | 69 | 54 | 57 | 62 | ... | ... | ... | SW | E | SE | 148 |
| 17 | 59 | 47 | 46 | 54 | 62 | 51 | ... | ... | ... | N | S | W | 218 |
| 18 | 65 | 52 | 58 | 53 | 64 | 53 | ... | ... | ... | W | SW | W | 121 |
| 19 | 65 | 65 | 83 | 53 | 52 | 53 | ... | ... | ... | W | NW | NW | 136 |
| 20 | 61 | 50 | 52 | 45 | 49 | 36 | 1 pm | 5 pm | 0.14 | W | NW | W | 312 |
| 21 | 36 | 33 | 59 | 30 | 41 | 48 | ... | ... | ... | NW | NW | SW | 343 |
| 22 | 43 | 31 | 52 | 36 | 40 | 41 | ... | ... | ... | NW | NW | SW | 266 |
| 23 | 63 | 65 | 68 | 41 | 59 | 40 | ... | ... | ... | SE | NW | SW | 156 |
| 24 | 70 | 45 | 48 | 46 | 50 | 40 | ... | ... | ... | SW | S | SE | 102 |
| 25 | 77 | 55 | 62 | 50 | 53 | 54 | ... | ... | ... | NW | S | NW | ... |
| 26 | 52 | 29 | 55 | 47 | 45 | 47 | ... | ... | ... | NW | NW | SE | 161 |
| 27 | 64 | 40 | 49 | 50 | 61 | 47 | ... | ... | ... | S | S | E | ... |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|----------------------------------|---------|---------|-------|---------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 28 | 67 | 95 | 70 | 77½ | 97 | 54 | 63 | 10 | 24.765 | 24.740 | 24.790 | 24.765 |
| 29 | 73 | 90 | 79 | 80½ | 94 | 58 | 66 | 11 | 24.840 | 24.790 | 24.840 | 24.823 |
| 30 | 70 | 85 | 72 | 75½ | 89 | 60 | 70 | 12 | 24.940 | 24.890 | 24.840 | 24.890 |
| | . | . | . | . | . | . | . | . | . | . | . | . |
| Sums | 1809 | 2248 | 1868 | 1975 | 1835 | 1179 | . | . | . | . | . | . |
| Means | 62.4 | 77.5 | 64.4 | 68.1 | . | . | 64.5 | 10.8 | 24.854 | 24.801 | 24.826 | 24.827 |

THE MONTH OF JUNE, 1888—*Concluded.*

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION. | | | WIND. | | | |
|-------------------|--|---------|---------|---------------------------|---------|---------|----------------|---------|---------------------------|---------|---------|---------|------------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning | Ending. | Inches rain, melted snow. | 7 a. m. | 2 p. m. | 9 p. m. | Daily movement, miles. |
| 28 | 45 | 28 | 64 | 45 | 56 | 57 | . | . | . | NW | SE | SE | ... |
| 29 | 65 | 29 | 47 | 61 | 53 | 57 | . | . | . | S | S | S | 117 |
| 30 | 55 | 47 | 42 | 53 | 62 | 47 | . | . | . | SW | S | N | 142 |
| ... | . | . | . | . | . | . | . | . | . | . | . | . | . |
| Sums | . | . | . | . | . | . | . | . | . | . | . | . | . |
| Mean | 57.6 | 43.5 | 56.3 | 46.1 | 51.6 | 47.3 | . | . | . | . | . | . | 2930 |
| Av'ge | . | 52.48 | . | . | 48.36 | . | . | . | 0.37 | . | . | . | . |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|--|---------|---------|-------|---------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 1 | 68 | 69 | 60 | 65½ | 84 | 58 | 76 | 9 | 24.840 | 24.840 | 24.790 | 24.823 |
| 2 | 57 | 82 | 68 | 69 | 87 | 51 | 67 | 6 | 24.840 | 24.815 | 24.940 | 24.865 |
| 3 | 68 | 86 | 70 | 74½ | 89 | 53 | 59 | 9 | 24.990 | 24.940 | 24.990 | 24.973 |
| 4 | 74 | 92 | 75 | 80½ | 94 | 55 | 63 | 12 | 25.065 | 25.040 | 25.040 | 25.048 |
| 5 | 68 | 87 | 76 | 77 | 90 | 62 | 59 | 13 | 24.940 | 25.015 | 24.990 | 24.982 |
| 6 | 67 | 95 | 70 | 77½ | 97 | 60 | 61 | 14 | 25.040 | 24.990 | 25.040 | 25.023 |
| 7 | 68 | 67 | 62 | 65½ | 83 | 63 | 67 | 9 | 25.065 | 25.040 | 25.040 | 25.048 |
| 8 | 65 | 78 | 62 | 68½ | 79 | 60 | 70 | 11 | 25.140 | 25.140 | 25.190 | 25.157 |
| 9 | 63 | 83 | 70 | 72 | 87 | 60 | 58 | 10 | 25.165 | 25.140 | 25.190 | 25.165 |
| 10 | 70 | 92 | 68 | 76½ | 95 | 55 | 57 | 11 | 25.140 | 25.090 | 25.090 | 25.107 |
| 11 | 71 | 97 | 74 | 80½ | 99 | 56 | 56 | 12 | 25.040 | 25.015 | 24.965 | 25.007 |
| 12 | 70 | 93 | 80 | 81 | 95 | 57 | 58 | 19 | 24.940 | 24.915 | 24.940 | 24.932 |
| 13 | 76 | 88 | 72 | 78½ | 90 | 75 | 70 | 20 | 25.040 | 25.040 | 25.090 | 25.057 |
| 14 | 70 | 81 | 72 | 74½ | 89 | 63 | 65 | 15 | 25.190 | 25.090 | 25.090 | 25.123 |
| 15 | 66 | 86 | 70 | 74 | 89 | 53 | 66 | 10 | 25.040 | 25.040 | 25.090 | 25.057 |
| 16 | 65 | 84 | 67 | 72 | 87 | 60 | 59 | 11 | 25.140 | 25.040 | 25.140 | 25.107 |
| 17 | 62 | 67 | 60 | 63 | 69 | 52 | 76 | 9 | 25.140 | 25.190 | 25.240 | 25.190 |
| 18 | 58 | 75 | 67 | 66½ | 80 | 56 | 63 | 11 | 25.165 | 25.190 | 25.240 | 25.197 |
| 19 | 64 | 86 | 69 | 73 | 89 | 53 | 60 | 12 | 25.215 | 25.190 | 25.165 | 25.190 |
| 20 | 69 | 75 | 63 | 69 | 87 | 55 | 71 | 13 | 25.165 | 25.165 | 25.240 | 25.190 |
| 21 | 71 | 84 | 68 | 74½ | 89 | 56 | 68 | 10 | 25.215 | 25.215 | 25.285 | 25.232 |
| 22 | 68 | 81 | 67 | 72 | 83 | 54 | 73 | . | 25.233 | 25.140 | 25.190 | 25.188 |
| 23 | 63 | 77 | 61 | 67 | 79 | 58 | 75 | . | 25.160 | 25.120 | 25.160 | 25.147 |
| 24 | 67 | 66 | 63 | 65½ | 78 | 62 | 79 | . | 25.135 | 25.065 | 25.090 | 25.097 |
| 25 | 68 | 85 | 69 | 74 | 86 | 62 | 58 | . | 25.065 | 25.020 | 25.040 | 25.042 |
| 26 | 65 | 80 | 70 | 71½ | . | . | 69 | . | 25.040 | 25.010 | 25.140 | 25.063 |
| 27 | 68 | 86 | 67 | 73½ | 87 | . | 63 | . | 25.040 | 25.040 | 25.140 | 25.073 |

THE MONTH OF JULY, 1888.

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION. | | | WIND. | | | Daily movement, miles. |
|-------------------|--|---------|---------|---------------------------|---------|---------|----------------|---------|---------------------------|---------|---------|---------|------------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow. | 7 a. m. | 2 p. m. | 9 p. m. | |
| 1 | 58 | 63 | 73 | 53 | 56 | 51 | 2 p m | 6 pm | 0.09 | W | W | W | 101 |
| 2 | 71 | 39 | 46 | 48 | 55 | 46 | ..... | ..... | ..... | NW | SE | W | 87 |
| 3 | 58 | 31 | 55 | 53 | 52 | 53 | ..... | ..... | ..... | W | SW | NW | 87 |
| 4 | 54 | 21 | 40 | 56 | 46 | 49 | ..... | ..... | ..... | SE | SE | SE | 74 |
| 5 | 63 | 30 | 38 | 55 | 51 | 48 | ..... | ..... | ..... | SW | W | E | 69 |
| 6 | 58 | 32 | 55 | 52 | 61 | 53 | ..... | ..... | ..... | W | SW | W | 21 |
| 7 | 71 | 76 | 72 | 58 | 59 | 55 | 2 p m | 3 pm | 0.05 | NW | W | SE | 85 |
| 8 | 65 | 46 | 79 | 53 | 55 | 55 | 3.30 p m | 4 pm | 0.06 | NE | N | SE | ... |
| 9 | 74 | 40 | 55 | 55 | 56 | 53 | ..... | ..... | ..... | NE | SE | SE | 100 |
| 10 | 52 | 37 | 46 | 51 | 62 | 46 | ..... | ..... | ..... | SW | S | SW | 80 |
| 11 | 60 | 36 | 36 | 56 | 65 | 45 | ..... | ..... | ..... | SW | S | SW | 81 |
| 12 | 48 | 29 | 29 | 49 | 56 | 45 | ..... | ..... | ..... | SW | E | NW | 120 |
| 13 | 38 | 40 | 49 | 48 | 61 | 52 | ..... | ..... | ..... | NW | SE | W | 193 |
| 14 | 64 | 41 | 53 | 57 | 55 | 54 | ..... | ..... | ..... | SE | SW | S | ... |
| 15 | 57 | 42 | 48 | 50 | 60 | 49 | ..... | ..... | ..... | SE | NW | SW | 130 |
| 16 | 75 | 49 | 62 | 57 | 63 | 54 | ..... | ..... | ..... | NW | S | NW | 70 |
| 17 | 74 | 58 | 68 | 53 | 52 | 49 | ..... | ..... | ..... | NW | NE | NE | 130 |
| 18 | 78 | 40 | 45 | 51 | 49 | 45 | ..... | ..... | ..... | SW | SE | SE | 80 |
| 19 | 65 | 29 | 43 | 52 | 49 | 46 | ..... | ..... | ..... | W | S | NE | 80 |
| 20 | 51 | 51 | 74 | 50 | 56 | 55 | 4 p m | 8 pm | 0.20 | S | N | W | 60 |
| 21 | 60 | 41 | 67 | 56 | 57 | 57 | ..... | ..... | ..... | NW | NE | ... | 104 |
| 22 | 71 | 48 | 85 | 58 | 59 | 62 | ..... | ..... | ..... | E | SE | ... | 71 |
| 23 | 89 | 56 | 94 | 60 | 60 | 50 | ..... | ..... | 0.05 | NW | SW | SE | ... |
| 24 | 85 | 90 | 89 | 62 | 63 | 60 | ..... | ..... | 0.15 | S | SE | SE | 90 |
| 25 | 81 | 38 | 63 | 62 | 57 | 56 | ..... | ..... | ..... | SE | S | SW | 97 |
| 26 | 70 | 35 | 64 | 55 | 50 | 57 | ..... | ..... | ..... | S | W | W | 148 |
| 27 | 76 | 45 | 66 | 60 | 62 | 55 | ..... | ..... | ..... | SE | NW | SW | 107 |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|--|---------|---------|------------------|--------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 28 | 70 | 91 | 78 | 79 $\frac{2}{3}$ | 92 | .. | 69 | .. | 25.140 | 25.040 | 25.040 | 25.073 |
| 29 | 68 | 85 | 71 | 74 $\frac{2}{3}$ | 90 | 57 | 66 | .. | 25.090 | 25.055 | 25.040 | 25.065 |
| 30 | 71 | 81 | 70 | 74 | 92 | 60 | 60 | .. | 25.040 | 24.990 | 25.040 | 25.023 |
| 31 | 66 | 80 | 70 | 72 | 81 | 63 | 64 | .. | 25.140 | 25.040 | 25.040 | 25.073 |
| Sums .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Means. | 67.2 | 82.5 | 68.7 | 72.81 | 87.2 | 54.6 | 65.3 | 11.7 | 25.084 | 25.054 | 25.08 | 25.075 |

THE MONTH OF JULY, 1888—*Concluded.*

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION | | | WIND. | | | |
|-------------------|--|---------|---------|---------------------------|---------|---------|---------------|---------|---------------------------|---------|---------|---------|------------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow. | 7 a. m. | 2 p. m. | 9 p. m. | Daily movement, miles. |
| 28 | 52 | 25 | 56 | 51 | 50 | 61 | ... | ... | ... | SE | SE | NW | 118 |
| 29 | 63 | 36 | 52 | 55 | 55 | 53 | ... | ... | ... | NW | NW | W | 106 |
| 30 | 77 | 58 | 60 | 63 | 65 | 55 | ... | ... | ... | NW | NW | NW | 73 |
| 31 | 61 | 44 | 60 | 52 | 56 | 55 | ... | ... | ... | SW | SE | W | 136 |
| Sums | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Means | 65.1 | 43.4 | 58.7 | 54.5 | 56.5 | 52.7 | ... | ... | 0.60 | ... | ... | ... | 2790 |
| Av'ge. | ... | 55.77 | ... | ... | 54.58 | ... | ... | ... | ... | ... | ... | ... | ... |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|----------------------------------|---------|---------|------------------|---------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 1 | 70 | 80 | 65 | 71 $\frac{1}{2}$ | 85 | 59 | 67 | .. | 25.040 | 24.990 | 25.040 | 25.023 |
| 2 | 68 | 81 | 64 | 71 | 83 | 57 | 75 | .. | 25.040 | 25.040 | 25.090 | 25.057 |
| 3 | 62 | 80 | 63 | 68 $\frac{1}{2}$ | 84 | 52 | 64 | .. | 25.090 | 25.040 | 25.065 | 25.065 |
| 4 | 58 | 77 | 60 | 65 | 88 | 49 | .. | .. | 25.040 | 24.940 | 24.940 | 24.973 |
| 5 | 62 | 83 | 66 | 79 $\frac{1}{2}$ | 86 | 50 | 62 | .. | 24.965 | 24.895 | 24.990 | 24.950 |
| 6 | 58 | 82 | 63 | 67 $\frac{2}{3}$ | 85 | 53 | 65 | .. | 25.040 | 24.890 | 25.040 | 24.990 |
| 7 | 54 | 73 | 61 | 62 $\frac{2}{3}$ | 77 | 44 | 72 | .. | 25.090 | 24.990 | 24.990 | 25.023 |
| 8 | 52 | 70 | 58 | 60 | 73 | 46 | 70 | .. | 25.240 | 25.090 | 25.090 | 25.140 |
| 9 | 56 | 82 | 68 | 68 $\frac{2}{3}$ | 85 | 46 | 65 | .. | 24.990 | 24.940 | 24.990 | 24.973 |
| 10 | 58 | 80 | 68 | 67 $\frac{2}{3}$ | 82 | 52 | 70 | .. | 25.040 | 25.040 | 25.140 | 25.073 |
| 11 | 58 | 76 | 65 | 66 $\frac{1}{3}$ | 78 | 60 | 70 | .. | 25.240 | 25.215 | 25.265 | 25.240 |
| 12 | 65 | 80 | 72 | 72 $\frac{1}{2}$ | 83 | 56 | 65 | .. | 25.198 | 25.190 | 25.165 | 25.215 |
| 13 | 63 | 62 | 67 | 64 | 88 | 60 | .. | .. | 25.115 | 25.040 | 25.140 | 25.098 |
| 14 | 56 | 80 | 57 | 64 $\frac{1}{3}$ | 84 | 55 | 62 | .. | 24.990 | 24.940 | 25.040 | 24.990 |
| 15 | 58 | 69 | 68 | 65 | 72 | 58 | 68 | .. | 24.985 | 24.990 | 25.115 | 25.030 |
| 16 | 55 | 63 | 62 | 60 | 68 | 55 | 42 | .. | 25.140 | 25.140 | 25.190 | 25.157 |
| 17 | 60 | 70 | 59 | 63 | 72 | 58 | 77 | .. | 25.210 | 25.040 | 25.140 | 25.130 |
| 18 | 62 | 80 | 58 | 66 $\frac{2}{3}$ | 73 | 50 | 66 | .. | 25.140 | 25.090 | 25.090 | 25.107 |
| 19 | 63 | 79 | 64 | 68 $\frac{2}{3}$ | 80 | 55 | 68 | 22 | 25.140 | 25.100 | 25.190 | 25.143 |
| 20 | 58 | 77 | 58 | 64 $\frac{1}{3}$ | 81 | 47 | 61 | 12 | 25.215 | 25.140 | 25.190 | 25.182 |
| 21 | 59 | 75 | 55 | 63 | 77 | 47 | 68 | 13 | 25.190 | 25.140 | 25.190 | 25.173 |
| 22 | 56 | 75 | 63 | 64 $\frac{2}{3}$ | 80 | 48 | 59 | 13 | 25.215 | 25.215 | 25.240 | 25.223 |
| 23 | 55 | 80 | 59 | 64 $\frac{2}{3}$ | 85 | 45 | 54 | 13 | 25.190 | 25.140 | 25.140 | 25.157 |
| 24 | 57 | 84 | 67 | 69 $\frac{1}{3}$ | 86 | 46 | 66 | 13 | 25.120 | 25.090 | 25.090 | 25.100 |
| 25 | 62 | 83 | 62 | 69 | 88 | 51 | 55 | 18 | 25.090 | 25.040 | 25.040 | 25.057 |
| 26 | 58 | 82 | 62 | 67 $\frac{1}{3}$ | 83 | 48 | 56 | 17 | 25.140 | 25.090 | 25.140 | 25.123 |
| 27 | 59 | 78 | 61 | 66 | 81 | 51 | 58 | 17 | 25.040 | 25.140 | 25.190 | 25.123 |

THE MONTH OF AUGUST, 1888.

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION. | | | WIND. | | | Daily movement, miles. |
|-------------------|--|---------|---------|---------------------------|---------|---------|----------------|----------|---------------------------|---------|---------|---------|------------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow. | 7 a. m. | 2 p. m. | 9 p. m. | |
| 1 | 64 | 47 | 65 | 57 | 58 | 53 | ... | ... | ... | S | SW | W | 109 |
| 2 | 63 | 44 | 70 | 55 | 57 | 54 | ... | ... | 0.15 | ... | SW | W | 130 |
| 3 | 64 | 35 | 60 | 50 | 50 | 49 | ... | ... | ... | E | W | NW | 94 |
| 4 | 67 | 49 | 63 | 47 | 56 | 47 | ... | ... | T. | W | W | S | 107 |
| 5 | 64 | 29 | 36 | 50 | 47 | 38 | ... | ... | ... | NW | W | NW | 107 |
| 6 | 78 | 39 | 55 | 51 | 55 | 47 | ... | ... | ... | E | NW | W | 160 |
| 7 | 76 | 39 | 63 | 46 | 46 | 48 | ... | ... | ... | ... | SE | W | 217 |
| 8 | 57 | 90 | 72 | 37 | 67 | 49 | ... | ... | ... | SW | W | W | 136 |
| 9 | 77 | 39 | 46 | 49 | 55 | 46 | ... | ... | ... | ... | ... | SW | 87 |
| 10 | 72 | 41 | 63 | 49 | 54 | 55 | ... | ... | ... | NW | E | NW | 97 |
| 11 | 83 | 55 | 65 | 53 | 59 | 53 | ... | ... | ... | SE | SW | NE | 104 |
| 12 | 75 | 44 | 42 | 57 | 56 | 47 | ... | ... | ... | SE | NW | NE | 93 |
| 13 | 60 | 84 | 66 | 49 | 57 | 55 | 2 pm | 3.15 pm | 0.25 | ... | SW | SW | ... |
| 14 | 88 | 44 | 83 | 53 | 56 | 52 | ... | ... | ... | ... | SE | NW | 94 |
| 15 | 83 | 59 | 85 | 53 | 54 | 63 | 7 am | 10.30 am | 0.16 | W | NW | W | 120 |
| 16 | 88 | 79 | 79 | 52 | 56 | 55 | 6 pm | 10 am | 0.45 | W | NW | W | 62 |
| 17 | 73 | 64 | 78 | 51 | 57 | 54 | ... | ... | ... | ... | ... | W | 43 |
| 18 | 79 | 44 | 78 | 55 | 56 | 51 | ... | ... | ... | SE | SE | SW | 58 |
| 19 | 55 | 31 | 56 | 47 | 46 | 48 | ... | ... | ... | NE | W | ... | 127 |
| 20 | 67 | 45 | 50 | 47 | 54 | 42 | ... | ... | ... | NW | SW | NW | 80 |
| 21 | 72 | 34 | 76 | 50 | 44 | 48 | ... | ... | ... | SW | SE | ... | 85 |
| 22 | 65 | 40 | 74 | 44 | 49 | 55 | ... | ... | ... | W | SW | SW | 90 |
| 23 | 76 | 54 | 62 | 48 | 62 | 46 | ... | ... | ... | SW | S | W | 50 |
| 24 | 66 | 27 | 62 | 46 | 46 | 54 | ... | ... | ... | SE | ... | N | 52 |
| 25 | 54 | 31 | 64 | 45 | 50 | 50 | ... | ... | ... | E | SE | ... | 100 |
| 26 | 67 | 36 | 54 | 47 | 53 | 45 | ... | ... | ... | W | S | ... | 78 |
| 27 | 62 | 43 | 58 | 46 | 53 | 46 | ... | ... | ... | ... | SE | SE | 65 |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|----------------------------------|---------|---------|------------------|---------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 28 | 58 | 72 | 63 | 64 $\frac{1}{3}$ | 78 | 52 | 71 | 16 | 25.230 | 25.190 | 25.190 | 25.203 |
| 29 | 62 | 79 | 62 | 67 $\frac{2}{3}$ | 82 | 51 | 61 | 16 | 25.140 | 25.080 | 25.090 | 25.103 |
| 30 | 65 | 82 | 65 | 70 $\frac{2}{3}$ | 85 | 51 | 64 | 20 | 25.140 | 25.140 | 25.215 | 25.165 |
| 31 | 58 | 80 | 77 | 71 $\frac{2}{3}$ | 83 | 51 | 55 | 20 | 25.240 | 25.140 | 25.140 | 25.173 |
| Sums . | 1845 | 2394 | 1962 | 2067 | | | 1856 | 210 | | | | |
| Means. | 59.5 | 77.2 | 63.3 | 66.68 | 81.5 | 51.7 | 64 | | 25.122 | 25.069 | 25.115 | 25.102 |

1890

THE MONTH OF AUGUST, 1888—*Concluded.*

| Day of the Month | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION | | | WIND. | | | |
|------------------|--|---------|---------|---------------------------|---------|---------|---------------|---------|---------------------------|---------|---------|---------|------------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow. | 7 a. m. | 2 p. m. | 9 p. m. | Daily movement, miles. |
| 28 | 89 | 61 | 74 | 55 | 58 | 55 | . | . | . | W | NW | SW | 93 |
| 29 | 69 | 43 | 59 | 52 | 55 | 48 | . | . | . | . | SE | SW | 54 |
| 30 | 56 | 31 | 65 | 49 | 48 | 53 | . | . | . | W | SW | NE | 57 |
| 31 | 72 | 41 | 56 | 49 | 54 | 60 | . | . | . | NE | S | NW | 106 |
| Sums.. | . | . | . | . | . | . | . | . | . | . | . | . | . |
| Mean.. | 70.3 | 46.5 | 63.8 | 49.6 | 53.8 | 50.5 | . | . | . | . | . | . | 2855 |
| Average.. | . | 60.22 | . | . | 51.29 | . | . | . | 1.01 | . | . | . | . |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|----------------------------------|---------|---------|-------|---------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 1 | 57 | 75 | 55 | 62½ | 80 | 47 | 68 | . | 25.240 | 25.190 | 25.240 | 25.223 |
| 2 | 57 | 76 | 57 | 63½ | 78 | 49 | 58 | . | 25.200 | 25.140 | 25.140 | 25.160 |
| 3 | 57 | 80 | 59 | 65½ | 83 | 44 | 60 | . | 25.165 | 25.140 | 25.190 | 25.165 |
| 4 | 54 | 82 | 58 | 64½ | 83 | 45 | 55 | . | 25.220 | 25.125 | 25.140 | 25.162 |
| 5 | 53 | 78 | 68 | 66½ | 80 | 45 | 70 | . | 25.065 | 24.985 | 25.040 | 25.030 |
| 6 | 60 | 79 | 63 | 67½ | 82 | 48 | 65 | . | 25.079 | 24.993 | 25.080 | 25.051 |
| 7 | 55 | 79 | 56 | 63½ | 81 | 47 | 57 | 14 | 25.206 | 25.129 | 25.199 | 25.178 |
| 8 | 52 | 85 | 57 | 64½ | 89 | 43 | 53 | 14 | 25.176 | 25.135 | 25.153 | 25.155 |
| 9 | 53 | 89 | 68 | 70 | 81 | 44 | 64 | 16 | 25.083 | 24.942 | 24.934 | 24.986 |
| 10 | 57 | 79 | 67 | 67½ | 80 | 50 | 75 | 15 | 24.971 | 24.952 | 25.040 | 24.988 |
| 11 | 53 | 63 | 52 | 56 | 70 | 47 | 63 | 12 | 25.232 | 25.186 | 25.154 | 25.191 |
| 12 | 51 | 80 | 64 | 65 | 83 | 44 | 74 | 12 | 25.176 | 25.047 | 25.077 | 25.100 |
| 13 | 53 | 84 | 67 | 68 | 85 | 45 | 57 | 11 | 25.032 | 24.932 | 24.937 | 24.967 |
| 14 | 55 | 69 | 49 | 57½ | 72 | 53 | 56 | 14 | 25.238 | 25.121 | 25.209 | 25.189 |
| 15 | 50 | 80 | 50 | 60 | 83 | 41 | 54 | 15 | 25.237 | 25.140 | 25.195 | 25.191 |
| 16 | 51 | 75 | 57 | 61 | 80 | 37 | 55 | 12 | 25.151 | 25.036 | 25.195 | 25.127 |
| 17 | 48 | 70 | 59 | 59 | 72 | 38 | 62 | 10 | 25.034 | 24.940 | 24.951 | 24.975 |
| 18 | 48 | 79 | 56 | 61 | 82 | 44 | 66 | 11 | 24.936 | 24.867 | 24.949 | 24.917 |
| 19 | 53 | 71 | 56 | 60 | 74 | 45 | 80 | 9 | 25.022 | 25.031 | 25.157 | 25.070 |
| 20 | 51 | 72 | 53 | 58½ | 75 | 41 | 56 | 10 | 25.204 | 25.118 | 25.130 | 25.151 |
| 21 | 49 | 82 | 58 | 63 | 87 | 39 | 51 | 9 | 25.110 | 25.019 | 25.082 | 25.070 |
| 22 | 40 | 77 | 56 | 60½ | 80 | 40 | 54 | . | 25.135 | 25.080 | 25.165 | 25.127 |
| 23 | 48 | 74 | 55 | 59 | 77 | 43 | 56 | 10 | 25.186 | 25.110 | 25.168 | 25.154 |
| 24 | 62 | 72 | 55 | 63 | 76 | 50 | 56 | 11 | 25.325 | 25.324 | 25.325 | 25.325 |
| 25 | 46 | 76 | 53 | 58½ | 80 | 43 | 54 | 12 | 25.302 | 25.101 | 25.061 | 25.155 |
| 26 | 48 | 72 | 53 | 57½ | 75 | 40 | 57 | 11 | 25.123 | 15.163 | 25.196 | 25.161 |
| 27 | 40 | 64 | 45 | 49½ | 68 | 32 | 56 | 9 | 25.250 | 25.177 | 25.188 | 25.205 |

1890

THE MONTH OF SEPTEMBER, 1888.

| Day of the Month | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION. | | | WIND. | | | Daily movement, miles. |
|------------------|--|---------|---------|---------------------------|---------|---------|----------------|----------|---------------------------|---------|---------|---------|------------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow. | 7 a. m. | 2 p. m. | 9 p. m. | |
| 1 | 77 | 40 | 88 | 50 | 49 | 52 | 2 pm | 7:30 p m | 0.12 | | NW | NW | 98 |
| 2 | 71 | 45 | 71 | 48 | 53 | 48 | | | | NE | SE | NW | 87 |
| 3 | 66 | 38 | 62 | 46 | 52 | 46 | | | | E | | SW | 68 |
| 4 | 70 | 20 | 61 | 44 | 37 | 45 | | | | E | | SW | 97 |
| 5 | 63 | 39 | 63 | 41 | 51 | 55 | 2 pm | 3 pm | 0.02 | | SW | N | 179 |
| 6 | 78 | 47 | 74 | 53 | 57 | 55 | | | | W | SW | NW | 55 |
| 7 | 70 | 53 | 71 | 46 | 61 | 47 | | | | W | SW | NW | 99 |
| 8 | 81 | 33 | 61 | 46 | 53 | 44 | | | | W | NW | N | 100 |
| 9 | 70 | 38 | 58 | 43 | 60 | 53 | | | | | S | | 68 |
| 10 | 71 | 43 | 49 | 48 | 55 | 47 | | | | | NE | NE | 50 |
| 11 | 75 | 60 | 81 | 45 | 49 | 46 | | | | NW | SW | W | 101 |
| 12 | 74 | 44 | 56 | 43 | 56 | 48 | 12 m | 1 pm | | W | SW | | 123 |
| 13 | 81 | 35 | 53 | 47 | 53 | 50 | 3:15 p m | 3:30 p m | 0.03 | | SW | | 86 |
| 14 | 70 | 53 | 73 | 46 | 51 | 41 | | | | | S | | 150 |
| 15 | 68 | 32 | 68 | 40 | 47 | 40 | | | | | NE | NE | 74 |
| 16 | 56 | 31 | 61 | 36 | 42 | 44 | | | | NW | SE | S | 98 |
| 17 | 60 | 52 | 62 | 35 | 51 | 46 | | | | NW | NE | W | 57 |
| 18 | 86 | 37 | 88 | 44 | 51 | 53 | 3:30 p m | 4:30 p m | 0.02 | | SW | | 75 |
| 19 | 87 | 48 | 88 | 49 | 51 | 53 | 5 pm | 9 pm | 0.10 | W | SE | S | 97 |
| 20 | 81 | 35 | 75 | 45 | 43 | 45 | | | | SW | SW | S | 88 |
| 21 | 67 | 22 | 61 | 38 | 40 | 45 | | | | | SW | W | 94 |
| 22 | 73 | 32 | 77 | 41 | 45 | 49 | | | | W | SW | SE | 68 |
| 23 | 79 | 43 | 81 | 42 | 50 | 46 | | | | SW | S | NW | 92 |
| 24 | 54 | 35 | 70 | 45 | 43 | 46 | | | | NW | NE | | 126 |
| 25 | 66 | 35 | 58 | 35 | 46 | 38 | | | | N | S | NW | 71 |
| 26 | 60 | 35 | 63 | 35 | 43 | 40 | | | | | SE | N | 87 |
| 27 | 68 | 60 | 71 | 30 | 50 | 36 | | | | NW | SE | S | 75 |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADIA- TION. | | BAROMETER. | | | |
|-------------------|--|---------|---------|------------------|---------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean |
| 28 | 44 | 75 | 48 | 55 $\frac{2}{3}$ | 76 | 35 | 56 | . | 25.205 | 25.230 | 25.331 | 25.255 |
| 29 | 41 | 70 | 50 | 53 $\frac{2}{3}$ | 73 | 36 | 57 | 12 | 25.352 | 25.253 | 25.247 | 25.284 |
| 30 | 41 | 79 | 60 | 60 | 83 | 36 | 57 | 12 | 25.171 | 25.012 | 24.994 | 25.059 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Sums .. | 1536 | 2286 | 1703 | 1842 | 2368 | 1291 | 1802 | 261 | ... | ... | ... | ... |
| Means. | 51.2 | 76.2 | 56.8 | 61.40 | 78.9 | 43 | 60 | 10.9 | 25.161 | 25.087 | 25.129 | 25.126 |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER-ING THERMOMETER. | | RADIATION. | | BAROMETER. | | | |
|-------------------|----------------------------------|---------|---------|-------|---------------------------|----------|------------|--------------|------------|---------|---------|---------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 1 | 56 | 72 | 46 | 58 | 74 | 58 | 73 | 24 | 25.106 | 25.073 | 25.129 | 25.103 |
| 2 | 41 | 67 | 60 | 56 | 68 | 38 | 59 | 13 | 25.131 | 24.988 | 24.938 | 25.019 |
| 3 | 47 | 70 | 52 | 56½ | 75 | 46 | 57 | 14 | 24.901 | 24.848 | 24.966 | 24.905 |
| 4 | 51 | 64 | 55 | 56½ | 67 | 51 | 63 | . | 24.926 | 24.928 | 24.980 | 24.945 |
| 5 | 45 | 51 | 45 | 47 | 56 | 44 | 76 | 5 | 25.099 | 25.083 | 25.119 | 25.100½ |
| 6 | 43 | 52 | 45 | 46½ | 55 | 42 | 66 | 5 | 25.147 | 25.090 | 25.049 | 25.095 |
| 7 | 37 | 63 | 47 | 49 | 67 | 35 | 66 | 14 | 25.096 | 25.057 | 25.055 | 25.069 |
| 8 | 42 | 69 | 52 | 54½ | 72 | 36 | 55 | 10 | 25.062 | 24.982 | 24.962 | 25.002 |
| 9 | 47 | 71 | 53 | 57 | 73 | 43 | 57 | 14 | 25.025 | 24.970 | 25.070 | 25.002 |
| 10 | 40 | 59 | 48 | 49 | 63 | 37 | 66 | 12 | 25.175 | 25.114 | 25.115 | 25.135 |
| 11 | 41 | 65 | 51 | 52½ | 68 | 38 | 63 | 11 | 25.104 | 24.994 | 25.171 | 25.090 |
| 12 | 42 | 58 | 42 | 47½ | 61 | 39 | 61 | 12 | 25.242 | 25.088 | 25.071 | 25.134 |
| 13 | 39 | 71 | 55 | 55 | 74 | 32 | 60 | 8 | 24.986 | 24.845 | 24.938 | 24.923 |
| 14 | 42 | 59 | 44 | 48½ | 61 | 41 | 59 | 16 | 25.121 | 24.994 | 24.980 | 25.032 |
| 15 | 35 | 68 | 46 | 49½ | 69 | 33 | 64 | 14 | 24.982 | 24.943 | 25.053 | 24.993 |
| 16 | 35 | 63 | 44.5 | 47½ | 66 | 29 | 63 | 9 | 25.021 | 24.955 | 24.935 | 24.970 |
| 17 | 40 | 71 | 54.5 | 55.2 | 73 | 35 | 63 | 11 | 24.870 | 24.749 | 24.801 | 24.807 |
| 18 | 52 | 53 | 34 | 46½ | 63 | 53 | 65 | 18 | 24.903 | 25.025 | 25.180 | 25.036 |
| 19 | 24 | 52.5 | 34 | 36.8 | 55 | 20 | 59 | 0 | 25.248 | 25.156 | 25.126 | 25.177 |
| 20 | 30 | 54 | 45 | 43 | 55 | 26 | 49.5 | 10 | 24.958 | 24.869 | 25.014 | 24.947 |
| 21 | 38 | 47.1 | 42 | 42.4 | 50 | 36 | 68 | 13 | 25.115 | 25.042 | 25.094 | 25.084 |
| 22 | 31 | 53.5 | 43.5 | 42½ | 56 | 29 | 59.5 | 10 | 25.050 | 24.947 | 24.986 | 24.994 |
| 23 | 39.5 | 62 | 48.5 | 50 | 65 | 29 | 67 | 14.5 | 24.935 | 24.808 | 24.805 | 24.849 |
| 24 | 55.5 | 62.5 | 50 | 56 | 64 | 43 | 47 | 15 | 24.734 | 24.691 | 24.740 | 24.722 |
| 25 | 38.5 | 46.5 | 34.5 | 39.8 | 51 | 38 | 59 | 13 | 24.755 | 24.703 | 24.723 | 24.727 |
| 26 | 31 | 51.5 | 42.5 | 41½ | 55 | 27 | 64 | 13 | 24.680 | 24.687 | 24.885 | 24.750 |
| 27 | 31 | 47 | 34 | 37½ | 49 | 20 | 63 | 11 | 25.052 | 25.045 | 25.088 | 25.062 |

THE MONTH OF OCTOBER, 1888.

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION | | | WIND. | | | Daily movement, miles. |
|-------------------|--|---------|---------|---------------------------|---------|---------|---------------|---------|---------------------------|---------|---------|---------|------------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow. | 7 a. m. | 2 p. m. | 9 p. m. | |
| 1 | 55 | 28 | 72 | 40 | 37 | 37 | ..... | ..... | ..... | N | NE | NW | 119 |
| 2 | 68 | 45 | 63 | 31 | 45 | 47 | 5 pm | ..... | T. | NE | SE | W | 95 |
| 3 | 79 | 36 | 100 | 41 | 42 | 52 | 8 pm | 12 pm | 0.51 | ..... | SE | SW | 82 |
| 4 | 81 | 56 | 76 | 45 | 48 | 48 | 8 pm | ..... | ..... | SW | S | NW | 151 |
| 5 | 89 | 69 | 85 | 42 | 41 | 41 | ..... | 3 am | 0.30 | W | N | N | 158 |
| 6 | 85 | 75 | 71 | 39 | 44 | 36 | Night of 5th | ..... | 0.07 | SE | SE | SE | 105 |
| 7 | 82 | 51 | 86 | 32 | 44 | 43 | ..... | ..... | ..... | S | E | ..... | 54 |
| 8 | 61 | 39 | 75 | 29 | 43 | 44 | ..... | ..... | ..... | ..... | S | NE | 68 |
| 9 | 72 | 27 | 41 | 39 | 35 | 30 | ..... | ..... | ..... | W | W | W | 121 |
| 10 | 68 | 47 | 79 | 30 | 39 | 42 | ..... | ..... | ..... | W | S | SW | 156 |
| 11 | 76 | 44 | 62 | 34 | 42 | 38 | ..... | ..... | ..... | W | SE | SW | 84 |
| 12 | 77 | 46 | 47 | 35 | 37 | 23 | ..... | ..... | ..... | SE | S | SW | 118 |
| 13 | 67 | 45 | 65 | 29 | 48 | 43 | ..... | ..... | ..... | W | SE | N | 81 |
| 14 | 77 | 43 | 49 | 35 | 36 | 26 | ..... | ..... | ..... | S | SW | SW | 233 |
| 15 | 64 | 31 | 66 | 24 | 36 | 35 | ..... | ..... | ..... | W | SE | SE | 130 |
| 16 | 64 | 38 | 59.5 | 24 | 37 | 30.5 | ..... | ..... | ..... | W | S | ..... | 88 |
| 17 | 59 | 45 | 50.5 | 27 | 48 | 36.5 | ..... | ..... | ..... | W | S | SE | 61 |
| 18 | 57 | 58 | 53 | 37 | 38 | 19 | ..... | ..... | ..... | NW | E | SE | 195 |
| 19 | 62 | 43.5 | 63 | 13 | 30.5 | 23 | ..... | ..... | ..... | W | SE | W | 100 |
| 20 | 48 | 53 | 50 | 13 | 37 | 27 | ..... | ..... | ..... | W | S | N | 95 |
| 21 | 50 | 34.5 | 47 | 21 | 21 | 23 | ..... | ..... | ..... | N | E | SE | 136 |
| 22 | 90 | 49.5 | 58.5 | 28 | 35 | 20 | ..... | ..... | ..... | SE | SW | W | 70 |
| 23 | 47.5 | 41 | 49 | 21 | 38 | 30 | ..... | ..... | ..... | ..... | NW | NW | 128 |
| 24 | 41 | 39.5 | 43 | 32 | 37.5 | 28 | ..... | ..... | ..... | W | E | N | 190 |
| 25 | 46.5 | 51.5 | 58.5 | 19.5 | 29.5 | 21.5 | ..... | ..... | ..... | SW | S | SE | 132 |
| 26 | 59 | 25.5 | 23 | 19 | 17 | 7.5 | ..... | ..... | ..... | SW | W | NW | 174 |
| 27 | 59 | 40 | 44 | 19 | 24 | 14 | ..... | ..... | ..... | SW | SE | SW | 322 |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|----------------------------------|---------|---------|--------|---------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 28 | 32 | 71 | 45 | 49½ | 73 | 24 | 52.5 | 9 | 25.078 | 25.066 | 25.177 | 25.107 |
| 29 | 39 | 71 | 44 | 51½ | 75 | 38 | 51 | 8 | 25.188 | 25.042 | 24.949 | 25.060 |
| 30 | 39 | 67 | 51 | 52½ | 74 | 34 | 83 | 13 | 25.012 | 24.954 | 24.966 | 24.977 |
| 31 | 36.5 | 68 | 47 | 50½ | 70 | 35 | 61 | 11.5 | 24.888 | 24.769 | 24.756 | 24.804 |
| Sums | 1240 | 1899 | 1435 | 1524.9 | 1997 | 1129 | . | . | . | . | . | . |
| Means | 40.0 | 61.3 | 46.3 | 49.19 | 64.4 | 36.4 | 61.9 | 11.7 | 25.019 | 24.952 | 24.994 | 24.988 |

HORTICULTURAL AND FORESTRY ASSOCIATION. 107

THE MONTH OF OCTOBER, 1888—*Concluded.*

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION | | | WIND. | | | |
|-------------------|--|---------|---------|---------------------------|---------|---------|---------------|---------|--------------------------|---------|---------|---------|-----------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow | 7 a. m. | 2 p. m. | 9 p. m. | Daily movement, miles |
| 28 | 70 | 48 | 67 | 23 | 51 | 34 | ... | ... | ... | W | SW | ... | 111 |
| 29 | 72 | 34 | 56 | 30 | 41 | 29 | ... | ... | ... | SW | S | SW | 80 |
| 30 | 51 | 33 | 50 | 22 | 37 | 33 | ... | ... | ... | SW | W | W | 70 |
| 31 | 64 | 31 | 52 | 25 | 36 | 30 | ... | ... | ... | SW | S | SE | 103 |
| Sums | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Mean | 65.84 | 43.45 | 59.39 | 29 | 37.9 | 32 | ... | ... | ... | ... | ... | ... | ... |
| Ave. | ... | 56.23 | ... | ... | 32.94 | ... | ... | ... | 0.88 | ... | ... | ... | 3810 |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|----------------------------------|---------|---------|-------------------|------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 1 | 52.5 | 48.5 | 34 | 45 | 60 | 42 | 43.5 | 12.6 | 24.789 | 24.866 | 24.957 | 24.871 |
| 2 | 28.5 | 61 | 37 | 42.2 | 84 | 29 | 57 | 9 | 25.057 | 25.067 | 25.091 | 25.072 |
| 3 | 27.55 | 54.5 | 43.5 | 42 | 58 | 27 | 52.5 | 9 | 24.990 | 24.845 | 24.817 | 24.884 |
| 4 | 34 | 43 | 39 | 38 $\frac{2}{3}$ | 45 | 35 | 41 | 12.5 | 24.974 | 24.800 | 24.774 | 24.843 |
| 5 | 28 | 42 | 29 | 33 | 44 | 29 | 64.5 | 10 | 24.977 | 24.983 | 25.081 | 25.014 |
| 6 | 22.5 | 38.2 | 31.5 | 30.7 | 40 | 32 | 67 | 22 | 25.000 | 24.835 | 24.811 | 24.882 |
| 7 | 32 | 33 | 27 | 30 $\frac{2}{3}$ | 37 | 31 | 60 | 10 | 24.880 | 25.056 | 25.183 | 25.040 |
| 8 | 19 | 41 | 27 | 29 | | 16 | 103* | 10 | 25.193 | 25.118 | 25.134 | 25.148 |
| 9 | 17.5 | 54 | 27 | 32.8 | | | 117* | 7* | 25.060 | 25.031 | 25.113 | 25.068 |
| 10 | 17 | 50.5 | 26 | 31.2 | | | 110 | 8 | 25.174 | 25.092 | 25.067 | 25.111 |
| 11 | 23 | 57 | 24.5 | 34.8 | | | 122 | 14 | 24.987 | 24.827 | 24.969 | 24.928 |
| 12 | 18 | 57 | 24.5 | 33.2 | | | 144 | 9 | 24.940 | 24.868 | 24.896 | 24.901 |
| 13 | 20 | 60.5 | 34 | 38.2 | | | 120 | 8 | 24.887 | 24.859 | 24.973 | 24.906 |
| 14 | 20 | 40 | 32 | 30 $\frac{2}{3}$ | | | 92 | 11 | 25.063 | 24.917 | 24.937 | 24.972 |
| 15 | 21 | 21.5 | 22 | 521 $\frac{3}{4}$ | | | 70 | 14 | 25.085 | 25.054 | 25.061 | 25.067 |
| 16 | 14 | 34 | 27 | 25 $\frac{1}{2}$ | | | 83 | 7 | 25.137 | 25.039 | 24.983 | 25.053 |
| 17 | 23 | 36.5 | 24 | 27.8 | | | 91* | 16* | 24.900 | 24.884 | 25.143 | 24.976 |
| 18 | 22 | 56.5 | 41 | 39.8 | 57 | 19 | 57 | 7 | 24.969 | 24.966 | 25.165 | 25.033 |
| 19 | 22 | 47 | 21.5 | 30.2 | 47.5 | 22 | 58.5 | 8 | 25.294 | 25.264 | 25.303 | 25.287 |
| 20 | 15.5 | 51.5 | 25 | 30 $\frac{2}{3}$ | 53 | 13 | 55 | 5 | 25.248 | 25.172 | 25.184 | 25.201 |
| 21 | 15.5 | 51 | 27 | 31.2 | 52 | 15.5 | 57 | 9.5 | 25.151 | 25.066 | 25.075 | 25.097 |
| 22 | 21 | 52.5 | 24 | 32.5 | 54 | 20 | 56 | 11 | 25.063 | 25.003 | 25.018 | 25.028 |
| 23 | 20 | 52.5 | 22.5 | 31 $\frac{2}{3}$ | 53.5 | 21 | 57.5 | 11 | 25.027 | 25.016 | 25.011 | 25.018 |
| 24 | 17 | 53 | 27 | 32 $\frac{1}{2}$ | 54 | 16.5 | 53 | 7.5 | 25.216 | 25.178 | 25.192 | 25.295 |
| 25 | 18 | 47 | 29.5 | 31 $\frac{1}{2}$ | 50 | 18 | 64 | 11 | 25.146 | 25.020 | 24.962 | 25.043 |
| 26 | 31.5 | 48 | 41 | 40.2 | 49 | 26 | 70 | 8 | 24.906 | 24.862 | 24.928 | 24.890 |
| 27 | 34 | 35 | 32 | 33 $\frac{2}{3}$ | 35 | 33 | 16.5 | 1 | 25.038 | 24.072 | 25.152 | 25.087 |

* The numbers under Solar Radiation from the 8th, and Terrestrial Radiation from the 9th to the 17th inclusive, are the readings of the instruments and not the difference between those readings and the registering thermometer.

THE MONTH OF NOVEMBER, 1888.

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION | | | WIND. | | | Daily movement, miles. |
|-------------------|--|---------|---------|---------------------------|---------|---------|---------------|---------|---------------------------|---------|---------|---------|------------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow. | 7 a. m. | 2 p. m. | 9 p. m. | |
| 1 | 27 | 83 | 81 | 19 | 43 | 29 | 1 pm | 4 pm | .03 | NW | S | SE | 175 |
| 2 | 100 | 40 | 65 | 28.5 | 36 | 26 | | | | SW | S | SW | 112 |
| 3 | 100 | 41 | 58 | 27 | 32 | 29 | | | | | S | W | 116 |
| 4 | 81 | 62 | 96 | 29 | 31 | 38 | 2 pm | Morning | .23 | S | SE | NW | 125 |
| 5 | 100 | 58 | 100 | 28 | 27 | 29 | | | | S | SE | | 196 |
| 6 | 93 | 48 | 90 | 21 | 20 | 28 | | | | | SE | SW | 94 |
| 7 | 70 | 71 | 77 | 23 | 25 | 21 | | | | N | NE | SW | 170 |
| 8 | 71 | 31 | 77 | 11 | 13 | 21 | | | | NW | NW | SW | 283 |
| 9 | 92 | 37 | 100 | 16 | 28 | 27 | | | | SE | S | SW | 156 |
| 10 | 84 | 24 | 88 | 13 | 15 | 23 | | | | NW | SE | SW | 110 |
| 11 | 80 | 12 | 94 | 18 | 5 | 22.0 | | | | NW | SE | SW | 123 |
| 12 | 85 | 21 | 81.5 | 14 | 18 | 19.5 | | | | | S | SW | 82 |
| 13 | 86 | 19.5 | 63 | 16 | 18.5 | 23 | | | | W | S | SW | 75 |
| 14 | 100 | 59 | 70 | 20 | 27 | 23 | | | | W | W | NE | 101 |
| 15 | 86 | 93 | 93.5 | 18 | 19.5 | 21.5 | | | | SE | SE | SE | 127 |
| 16 | 100 | 54 | 89 | 14 | 20 | 24 | | | | | SE | N | 88 |
| 17 | 80 | 60 | 75 | 18 | 23 | 17 | | | | E | | S | 104 |
| 18 | 93 | 25 | 68 | 20 | 21 | 31 | | | | NW | S | NW | 71 |
| 19 | 100 | 28 | 79 | 22 | 15 | 16 | | | | W | SE | SE | 126 |
| 20 | 100 | 25 | 88 | 15.5 | 17 | 22 | | | | W | SW | | 93 |
| 21 | 91 | 28 | 83 | 13 | 19 | 22 | | | | | | SE | 73 |
| 22 | 93 | 25 | 62 | 19 | 17 | 13 | | | | W | SW | SW | 98 |
| 23 | 93 | 14 | 86 | 19 | 5 | 19 | | | | W | SE | W | 112 |
| 24 | 92 | 15 | 60 | 15 | 7 | 15 | | | | W | S | SW | 69 |
| 25 | 85 | 34 | 89 | 14 | 20 | 26 | | | | W | SE | | 60 |
| 26 | 90 | 53 | 64 | 28 | 32 | 29 | | | | W | NE | NE | 81 |
| 27 | 95 | 77 | 100 | 32 | 28 | 32 | All day | | .06 | NW | NE | | 144 |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|--|------------|---------|-------|---------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 28 | 31 | 38.29.5 | 32.8 | | 37 | 30 | 21 | 1/2 | 25.200 | 25.184 | 25.236 | 25.207 |
| 29 | 28 | 37.28.5 | 31.2 | | 39 | 28 | 65 | 2 | 25.166 | 26.078 | 25.070 | 25.107 |
| 30 | 15 | 41.5 23.5 | 26 1/2 | | 43 | 15 | 59 | 9 | 25.032 | 24.984 | 24.904 | 25.003 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Sums. . | 707 | 1384' 881. | 991.3 | | ... | ... | ... | ... | ... | ... | ... | ... |
| Means. | 23.5 | 46.1 29.3 | 33.04 | | 48.6 | 24.7 | 53.7 | 8.8 | 25.052 | 25.000 | 25.042 | 25.031 |

THE MONTH OF NOVEMBER, 1888—*Concluded.*

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION | | | WIND. | | | |
|-------------------|--|---------|---------|---------------------------|---------|---------|---------------|--------|---------------------------|---------|---------|---------|------------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning | Ending | Inches rain, melted snow. | 7 a. m. | 2 p. m. | 9 p. m. | Daily movement, miles. |
| 28 | 90 | 57 | 100 | 28 | 24 | 29.5 | 2 1/2 | noon | .06 | NH | E | . | . |
| 29 | 100 | 56 | 100 | 28 | 23 | 28.5 | . | . | .06 | . | SW | SW | 76 |
| 30 | 100 | 35 | 87 | 15 | 16 | 20 | . | . | . | . | SW | SW | 75 |
| . | . | . | . | . | . | . | . | . | . | . | . | . | 69 |
| Sums | . | . | . | . | . | . | . | . | . | . | . | . | . |
| Mean | 88.6 | 42.8 | 82.1 | 20 | 21.5 | 24.2 | . | . | 0.38 | . | . | . | 3384 |
| Av'ge | . | 71.17 | . | . | 25.68 | . | . | . | . | . | . | . | . |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER. | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|----------------------------------|---------|---------|-------|---------------------------------------|----------|-----------------|--------------|------------|---------|---------|--------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 1 | 10.5 | 46 | 42 | 32.8 | 48 | 11 | 61 | 9 | 24.888 | 24.833 | 24.857 | 24.859 |
| 2 | 12.5 | 42 | 32 | 32.2 | 43 | 32.5 | 66 | 2 | 25.097 | 25.166 | 25.270 | 25.178 |
| 3 | 14.5 | 52 | 39.5 | 32.3 | 54 | 12.5 | 54 | 7.5 | 25.256 | 25.224 | 25.194 | 25.225 |
| 4 | 48 | 66.5 | 58.5 | 51 | 68 | 26 | 54 | 11 | 25.154 | 25.080 | 25.136 | 25.123 |
| 5 | 18.5 | 55 | 24 | 32.5 | 57 | 19 | 56 | 12 | 25.195 | 25.071 | 24.993 | 25.086 |
| 6 | 23.5 | 51 | 30 | 34.5 | 53 | 18 | 41 | 11.5 | 24.911 | 24.910 | 24.885 | 24.902 |
| 7 | 29 | 57 | 20.5 | 33.5 | 52.5 | 27 | 55 | 11.5 | 24.910 | 24.922 | 24.994 | 24.942 |
| 8 | 18 | 50 | 30 | 30.3 | 51 | 15 | 56.5 | 14 | 24.934 | 25.018 | 25.009 | 24.987 |
| 9 | 32 | 56.5 | 29.5 | 39.2 | 58 | 18 | 6.6 | 9 | 24.921 | 24.900 | 24.966 | 24.929 |
| 10 | 22.5 | 45.5 | 31 | 33 | 49.5 | 19 | 51.5 | 10 | 25.046 | 24.945 | 24.918 | 24.986 |
| 11 | 23 | 51.5 | 30 | 34.8 | 53 | 20 | 53 | 11 | 24.916 | 24.909 | 25.018 | 24.948 |
| 12 | 16 | 54.5 | 34.5 | 35 | 60 | 18 | 51 | 11 | 25.020 | 24.994 | 25.034 | 25.016 |
| 13 | 19 | 54.5 | 25 | 32.8 | 57.5 | 18 | 54.5 | 11 | 25.001 | 24.873 | 24.848 | 24.907 |
| 14 | 20 | 44 | 39 | 34.3 | 48.5 | 21 | 50.5 | 7.5 | 24.740 | 24.806 | 24.589 | 24.612 |
| 15 | 31.5 | 49.5 | 38.5 | 39.6 | 50 | 32 | 61.5 | 12 | 24.677 | 24.682 | 24.832 | 24.730 |
| 16 | 29 | 46.5 | 32 | 36.5 | 48 | 27.5 | 57 | 8.5 | 24.926 | 24.889 | 24.904 | 24.906 |
| 17 | 40 | 41 | 26 | 35.7 | 47 | 26 | 57 | 11 | 25.032 | 25.168 | 25.247 | 25.149 |
| 18 | 17 | 43 | 21.5 | 27.2 | 46 | 15.5 | 59.5 | 9.5 | 25.232 | 25.188 | 25.219 | 25.213 |
| 19 | 14.3 | 54.5 | 29 | 32.6 | 56 | 13 | 54.5 | 7.5 | 25.193 | 25.092 | 25.088 | 25.124 |
| 20 | 20.5 | 55.4 | 28 | 34.6 | 57 | 22 | 59.1 | 15.5 | 25.196 | 25.093 | 25.142 | 24.144 |
| 21 | 25 | 55.6 | 20.3 | 33.6 | 58 | 23 | 44 | 9.5 | 25.082 | 24.955 | 24.935 | 24.991 |
| 22 | 22.6 | 58.8 | 35.5 | 39 | 63 | 18 | 59.4 | 11.2 | 24.798 | 24.690 | 24.673 | 24.720 |
| 23 | 24 | 51.5 | 33 | 36.2 | 52 | 23 | 30 | 9 | 24.640 | 24.629 | 24.695 | 24.665 |
| 24 | 23.5 | 34.9 | 24.8 | 27.7 | 37.5 | 19 | 65.5 | 9 | 24.744 | 24.794 | 24.923 | 24.820 |
| 25 | 19.5 | 52.5 | 20 | 20.7 | 23 | 19 | 53.5 | 8.5 | 24.987 | 24.993 | 24.928 | 24.969 |
| 26 | 12 | 31 | 11 | 18 | 33 | 11 | 67 | 11 | 24.536 | 24.816 | 24.901 | 24.751 |
| 27 | 4 | 29.5 | 15.9 | 16.5 | 31 | 4 | 81 | 13.5 | 24.820 | 24.954 | 25.057 | 24.944 |

HORTICULTURAL AND FORESTRY ASSOCIATION. 113

THE MONTH OF DECEMBER, 1888.

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION. | | WIND. | | Daily movement, miles. | | |
|-------------------|--|---------|---------|---------------------------|---------|---------|----------------|---------|---------------------------|---------|------------------------|---------|---------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow. | 7 a. m. | | 2 p. m. | 9 p. m. |
| 1 | 90 | 26 | 29 | 9 | 13 | 12 | | | | SW | W | 83 | |
| 2 | 90 | 40 | 100 | 29 | 19 | 22 | | | | NW | N | 246 | |
| 3 | 91 | 19 | 44 | 12 | 11 | 10 | | | | W | S | 123 | |
| 4 | 23 | 16 | 34 | 12 | 24 | 12 | | | | NW | W | 215 | |
| 5 | 70 | 14 | 56 | 10 | 6 | 10 | | | | W | SE | 174 | |
| 6 | 74 | 28 | 48 | 16 | 19 | 13 | | | | NW | W | 87 | |
| 7 | 76 | 22 | 65 | 23 | 14 | 10 | | | | W | SW | 64 | |
| 8 | 83 | 16 | 53 | 11 | 5 | 11 | | | | | S | SW | 84 |
| 9 | 80 | 9 | 68 | 27 | -2 | 20.5 | | | | S | SW | W | 85 |
| 10 | 55 | 32 | 59 | 8 | 17 | 19 | | | | NE | SE | SW | 110 |
| 11 | 87 | 21 | 79 | 20 | 12 | 24 | | | | SW | SE | W | 108 |
| 12 | 84 | 28 | 67.5 | 12 | 21 | 24.5 | | | | NW | | W | 116 |
| 13 | 85 | 25 | 100 | 15 | 22 | 25 | | | | NW | | SW | 90 |
| 14 | 65 | 43 | 100 | 9 | 23 | 29 | | | | NW | W | NE | 84 |
| 15 | 84 | 31 | 39 | 27 | 20 | 15 | 5 pm | 8 pm | .03 | NW | NW | | 193 |
| 16 | 57 | 21 | 80 | 16 | 8 | 27 | | | | NW | SE | SE | 410 |
| 17 | 59 | 38 | 47 | 27 | 17 | 8 | | | | NW | NW | | 197 |
| 18 | 84 | 28 | 46 | 13 | 12 | 4 | | | | NW | S | NW | 209 |
| 19 | 100 | 30 | 100 | 14.3 | 24 | 29 | | | | W | SE | | 98 |
| 20 | 79 | 28 | 100 | 15 | 23 | 28 | | | | NW | SE | NW | 100 |
| 21 | 73 | 33 | 94 | 17 | 27 | 19 | | | | | NW | | 88 |
| 22 | 86.5 | 20.5 | 54 | 19.5 | 18 | 21 | | | | NW | SW | NW | 56 |
| 23 | 75 | 48 | 85 | 17 | 32 | 29 | | | | NW | N | NW | 94 |
| 24 | 90 | 68 | 100 | 21 | 25 | 24.8 | 8 pm | | | NW | NE | SE | 131 |
| 25 | 93 | 80 | 93 | 18 | 18 | 18 | 8 am | 6.13 | | SE | SE | | 146 |
| 26 | 81 | 69 | 62 | 7 | 22 | 0 | | | | SE | E | W | 80 |
| 27 | 31 | 48 | 94 | -20 | 12 | 14 | | | | | S | | 105 |

METEOROLOGICAL OBSERVATIONS FOR

| Day of the Month. | TEMPERATURE OF THE AIR IN SHADE. | | | | REGISTER- ING THERMOM- ETER | | RADI- ATION. | | BAROMETER. | | | |
|-------------------|--|---------|---------|-------|--------------------------------------|----------|-----------------|--------------|------------|---------|---------|---------|
| | 7 a. m. | 2 p. m. | 9 p. m. | Mean. | Maximum. | Minimum. | Solar. | Terrestrial. | 7 a. m. | 2 p. m. | 9 p. m. | Mean. |
| 28 | 4.5 | 38.5 | 17.5 | 20.2 | 41 | 4 | 55 | 11 | 25.011 | 25.026 | 25.096 | 25.044 |
| 29 | 11 | 38.5 | 17.5 | 22.3 | 40 | 9 | 58 | 9.5 | 25.134 | 25.083 | 25.093 | 25.103 |
| 30 | 5.5 | 38 | 21.5 | 21.7 | 40 | 6 | 59 | 10 | 25.158 | 25.211 | 25.348 | 25.239 |
| 31 | 5.5 | 39.5 | 13.5 | 19.5 | 42 | 5 | 57 | 8 | 25.409 | 25.319 | 25.293 | 25.340 |
| Sums.. | 633. | 1448 | 829. | 970. | | | | | 774.564 | 773.983 | 775.985 | 774.542 |
| Means. | 20.4 | 46.7 | 26.7 | 31.30 | 48.95 | 17.81 | 56.4 | 10.1 | 24.988 | 24.967 | 25.003 | 24.985 |

HORTICULTURAL AND FORESTRY ASSOCIATION. 115

THE MONTH OF DECEMBER, 1888—*Concluded.*

| Day of the Month. | RELATIVE HUMIDITY OR PER CENT OF SATURATION. | | | TEMPERATURE OF DEW POINT. | | | PRECIPITATION | | | WIND. | | | |
|-------------------|--|---------|---------|---------------------------|---------|---------|---------------|---------|---------------------------|---------|---------|---------|------------------------|
| | 7 a. m. | 2 p. m. | 9 p. m. | 7 a. m. | 2 p. m. | 9 p. m. | Beginning. | Ending. | Inches rain, melted snow. | 7 a. m. | 2 p. m. | 9 p. m. | Daily movement, miles. |
| 28 | 100 | 47 | 76 | 4.5 | 19 | 12 | . | . | . | SE | . | NE | 56 |
| 29 | 81 | 31 | 92 | 6 | 10 | 16 | . | . | . | SW | . | . | 42 |
| 30 | 88 | 30 | 60 | 3 | 9 | 10 | . | . | . | . | N | NW | 106 |
| 31 | 88 | 36 | 56 | 3 | 15 | 3 | . | . | . | . | . | NW | 102 |
| Sums | . | . | . | . | . | . | . | . | . | . | . | . | . |
| Means. | 77.9 | 33.2 | 70.3 | 13.6 | 16.6 | 16.8 | . | . | 0.16 | . | . | . | 382 |
| Av'ge. | . | 60.47 | . | . | 15.66 | . | . | . | . | . | . | . | . |

ABSTRACT FOR THE YEAR.

| MONTHS. | Mean Barometer. | TEMPERATURE OF AIR IN SHADE. | | | Mean temperature of dew point. | Mean relative humidity. | Total movement of wind, miles. | Inches rain and melted snow. | Evaporation, inches. | Sunshine, per cent. |
|---------------------|-----------------|------------------------------|----------|---------|--------------------------------|-------------------------|--------------------------------|------------------------------|----------------------|---------------------|
| | | Mean. | Highest. | Lowest. | | | | | | |
| January | 24.818 | 22.2 | 71 | .28 | 2.82 | 44.60 | 2985 | 0.29 | . . . | 71.5 |
| February | 24.793 | 37.1 | 68 | 12 | 24.52 | 61.46 | 5224 | 0.36 | . . . | . . . |
| March | 24.805 | 37.4 | 79 | 3 | 21.77 | 59.74 | 4039 | 0.73 | . . . | 79.1 |
| April | 24.944 | 55.3 | 87 | 30 | 42.0 | 62.60 | *5535 | 1.73 | . . . | . . . |
| May | 24.835 | 54.4 | 84 | 30 | 40.16 | 62.16 | 4200 | 3.39 | 4.45 | . . . |
| June | 24.827 | 68.1 | 97 | 42 | 48.36 | 52.48 | *4400 | 0.47 | 7.70 | . . . |
| July | 25.075 | 72.8 | 99 | 51 | 54.58 | 55.77 | *3090 | 0.60 | 7.00 | 69.2 |
| August | 25.102 | 66.6 | 88 | 44 | 51.29 | 60.22 | *2950 | 1.01 | 4.65 | 71.6 |
| September | 25.126 | 61.4 | 89 | 32 | 45.67 | 59.73 | 2538 | 0.29 | 3.35 | 83.2 |
| October | 24.918 | 49.2 | 75 | 20 | 32.94 | 56.23 | 3810 | 0.88 | 2.17 | 63.9 |
| November | 25.031 | 33.0 | 64 | 13 | 25.68 | 71.17 | 3384 | 0.38 | 1.35 | 60.0 |
| December | 24.985 | 31.3 | 68 | .4 | 15.66 | 60.47 | 3882 | 0.16 | .99 | 68.8 |
| Year | 24.944 | 49.01 | . . . | . . . | 33.79 | 58.88 | 46037 | 9.79 | . . . | . . . |

SUNSHINE.

The sunshine for the eight months of 1888, of which we have record, bears out Colorado's claim to a sunny climate. For comparison we put side by side the record from the New York Experiment Station in Central New York and our own:

| MONTH. | NEW YORK. | COLORADO. |
|---------------------|-----------|-----------|
| January | 14.5 | 71.5 |
| March | 29.7 | 79.1 |
| July | 57.9 | 69.2 |
| August | 56 | 71.6 |
| September | 55 | 83.2 |
| October | 41.8 | 63.9 |
| November | 34.8 | 60 |
| December | 24.2 | 68.8 |
| Year | 39.2 | 71 |

That given in the New York record is not the average, but the greatest amount of sunshine in the given month their record shows.

Our location being within a few miles of the foot-hills, their shadow shortens our afternoons. Estimating their average elevation at 3° , our day is shortened by from $18\frac{1}{2}$ to 21 minutes, according to the declination of the sun. This correction has been taken into account in finding the possible amount of sunshine. It will be noticed that the recorded amount of sunshine on one or two days in October and November exceeds the possible amount by several minutes. The records of these days has been looked on with some doubt, but a careful scrutiny and repeated measurements seem to render it probable that the number given is correct within 5 minutes. The amount observed is, however, less than the amount that would be received were the mountains absent.

The record for July and August is taken from the self-registering Draper sun thermometer, and the amount of sunshine has wider limits of error than in the other months, which are recorded by Pickering's form of sunshine recorder.

SUNSHINE FOR 1888.

| Day of Month. | JANUARY. | | MARCH. | | JULY. | | AUGUST. | | SEPTEMBER. | | OCTOBER. | | NOVEMBER. | | DECEMBER. | |
|---------------|----------|-----------|---------|-----------|---------|-----------|---------|-----------|------------|-----------|----------|-----------|-----------|-----------|-----------|-----------|
| | Actual. | Possible. | Actual. | Possible. | Actual. | Possible. | Actual. | Possible. | Actual. | Possible. | Actual. | Possible. | Actual. | Possible. | Actual. | Possible. |
| 1 . . . | 9.15 | 9.12 | 10.40 | 11.31 | 7.30 | 14.53 | 10.30 | 13.54 | 8.00 | 12.44 | 5.50 | 11.27 | 6.25 | 10.05 | 8.35 | 9.07 |
| 2 . . . | | | | 10.56 | 13.30 | 14.53 | 11.05 | 13.52 | 12.41 | 12.41 | 7.55 | 11.24 | 5.35 | 10.03 | 9.05 | 9.06 |
| 3 . . . | | | 3.00 | 10.58 | 14.00 | 14.48 | 9.00 | 13.50 | 12.39 | 12.39 | 5.28 | 11.21 | | 10.00 | 4.35 | 9.05 |
| 4 . . . | | | 3.30 | 11.01 | 13.45 | 14.45 | 11.40 | 13.48 | 12.15 | 12.36 | 4.42 | 11.18 | 4.35 | 9.58 | 9.05 | 9.04 |
| 5 . . . | | | 7.00 | 11.04 | 7.00 | 14.42 | 13.30 | 13.46 | 6.40 | 12.34 | 2.34 | 11.16 | 4.40 | 9.55 | 9.02 | 9.02 |
| 6 . . . | | | 10.00 | 11.06 | 13.00 | 14.39 | 13.00 | 13.43 | 7.00 | 12.31 | 3.42 | 11.13 | 5.15 | 9.53 | 2.20 | 9.01 |
| 7 . . . | | | 9.00 | 11.09 | 8.00 | 14.37 | 13.30 | 13.41 | 12.29 | 12.29 | 7.34 | 11.10 | 5.50 | 9.51 | 5.00 | 8.60 |
| 8 . . . | 9.02 | 9.02 | 8.30 | 11.12 | 9.00 | 14.34 | 13.00 | 13.39 | 12.26 | 12.26 | 10.34 | 11.07 | 9.51 | 9.49 | 9.00 | 8.60 |
| 9 . . . | 9.03 | 9.03 | | 11.15 | 13.30 | 14.31 | 13.15 | 13.37 | 11.50 | 12.24 | 11.30 | 11.05 | 5.25 | 9.47 | 8.40 | 8.59 |
| 10 . . . | 9.04 | 9.04 | 11.00 | 11.17 | 14.30 | 14.30 | 10.35 | 13.35 | 8.15 | 12.21 | 7.50 | 11.02 | 9.42 | 9.45 | 4.50 | 8.59 |
| 11 . . . | 9.06 | 9.06 | 11.20 | 11.20 | 14.45 | 14.28 | 11.00 | 13.33 | 4.20 | 12.19 | 4.15 | 11.00 | 9.40 | 9.42 | 4.20 | 8.58 |
| 12 . . . | 9.08 | 9.08 | 11.23 | 11.23 | 14.00 | 14.27 | 9.00 | 13.31 | 12.16 | 12.16 | 8.49 | 10.57 | 10.00 | 9.40 | 9.00 | 8.57 |
| 13 . . . | 9.09 | 9.09 | 11.25 | 11.25 | 13.30 | 14.26 | 9.20 | 13.28 | 5.40 | 12.13 | 9.00 | 10.55 | 4.55 | 9.38 | 8.00 | 8.57 |
| 14 . . . | 9.11 | 9.11 | 11.28 | 11.28 | 3.30 | 14.25 | 7.05 | 13.26 | 12.11 | 12.11 | 10.45 | 10.52 | 1.35 | 9.36 | 4.20 | 8.56 |
| 15 . . . | 9.15 | 9.12 | 10.40 | 11.31 | 10.00 | 14.23 | 3.25 | 13.24 | 12.08 | 12.08 | 10.12 | 10.50 | 2.30 | 9.34 | 8.10 | 8.56 |

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| | | | | | | | | | | | | | | | | |
|------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 16... | 9.14 | 9.14 | 3.30 | 11.33 | 11.30 | 14.22 | 1.40 | 13.22 | 12.06 | 12.06 | 10.23 | 10.47 | 1.65 | 9.32 | 5.45 | 8.55 |
| 17... | 8.10 | 9.16 | 10.30 | 11.36 | 3.00 | 14.21 | 1.35 | 13.20 | 7.35 | 12.03 | 1.11 | 10.45 | 5.15 | 9.30 | 5.05 | 8.55 |
| 18... | 9.17 | 9.17 | 10.00 | 11.39 | 12.20 | 14.19 | 3.50 | 13.18 | 5.40 | 12.00 | 2.42 | 10.42 | 8.45 | 9.28 | 7.55 | 8.55 |
| 19... | 8.10 | 9.19 | 11.00 | 11.42 | 14.00 | 14.18 | 4.30 | 13.16 | 2.40 | 11.54 | 10.50 | 10.40 | 9.25 | 9.27 | 9.00 | 8.54 |
| 20... | 9.00 | 9.20 | 4.00 | 11.44 | 7.00 | 14.16 | 7.55 | 13.13 | 11.55 | 11.55 | 1.34 | 10.37 | 9.23 | 9.25 | 6.20 | 8.54 |
| 21... | 9.22 | 9.22 | 10.00 | 11.47 | 6.00 | 14.15 | 5.10 | 13.11 | 11.53 | 11.53 | 8.45 | 10.34 | 9.21 | 9.23 | 7.00 | 8.54 |
| 22... | 1.30 | 9.24 | 6.00 | 11.50 | 6.00 | 14.13 | 9.50 | 13.08 | 11.50 | 11.50 | 9.00 | 10.31 | 8.30 | 9.21 | 4.25 | 8.54 |
| 23... | 9.00 | 9.26 | 12.00 | 11.52 | 4.00 | 14.11 | 13.06 | 13.06 | 11.35 | 11.48 | 7.05 | 10.29 | 9.05 | 9.19 | .05 | 8.54 |
| 24... | 9.00 | 9.28 | 7.00 | 11.55 | 8.00 | 14.10 | 13.04 | 13.04 | 11.30 | 11.45 | .45 | 10.26 | 8.55 | 9.18 | 3.20 | 8.53 |
| 25... | 8.00 | 9.30 | 3.00 | 11.58 | 11.00 | 14.08 | 12.30 | 13.01 | 11.43 | 11.43 | 4.40 | 10.23 | 4.25 | 9.16 | ... | 8.53 |
| 26... | 9.32 | 9.32 | 5.00 | 12.00 | 10.00 | 14.06 | 12.30 | 12.59 | 11.40 | 11.40 | 9.23 | 10.21 | 1.00 | 9.14 | 6.45 | 8.53 |
| 27... | 9.34 | 9.34 | .30 | 12.03 | 11.30 | 14.04 | 9.20 | 12.56 | 11.38 | 11.38 | 7.15 | 10.18 | ... | 9.13 | 3.30 | 8.53 |
| 28... | 9.00 | 9.36 | 2.00 | 12.06 | 9.00 | 14.03 | 10.00 | 12.54 | 10.25 | 11.35 | 9.26 | 10.15 | 1.55 | 9.11 | 8.55 | 8.53 |
| 29... | 9.38 | 9.38 | 11.30 | 12.09 | 9.00 | 14.01 | 10.51 | 12.51 | 11.32 | 11.32 | 10.22 | 10.12 | 8.10 | 9.10 | 9.00 | 8.52 |
| 30... | 9.40 | 9.40 | 12.12 | 12.12 | 9.00 | 13.59 | 8.00 | 12.49 | 10.00 | 11.30 | 6.05 | 10.10 | ... | 9.09 | 9.05 | 8.52 |
| 31... | 9.42 | 9.42 | 11.40 | 12.14 | 9.00 | 13.57 | 12.00 | 12.46 | ... | ... | 4.30 | 10.07 | ... | ... | ... | ... |
| Total | 201.47 | 281.03 | 287.38 | 363.28 | 308.50 | 445.44 | 294.46 | 414.01 | 304.42 | 366.28 | 214.36 | 334.14 | 172.12 | 287.15 | 190.12 | 276.31 |
| Per cent actual of possible. | ... | 71.5 | ... | 79.1 | ... | 69.2 | ... | 71.6 | ... | 83.2 | ... | 63.9 | ... | 60.0 | ... | 68.8 |

SOIL TEMPERATURES.

| WEEK ENDING. | 7 A. M. | | | | | | 2 P. M. | | | | | | 9 P. M. | | | | | |
|------------------------|-------------|-----------|-----------|-----------|-------------|-----------|-------------|-----------|-----------|-----------|-------------|-----------|-------------|-----------|-----------|-----------|-------------|-----------|
| | Three inch. | Six inch. | One foot. | Two feet. | Three feet. | Six feet. | Three inch. | Six inch. | One foot. | Two feet. | Three feet. | Six feet. | Three inch. | Six inch. | One foot. | Two feet. | Three feet. | Six feet. |
| June 16 | 65.1 | 67.1 | 62.1 | 58.1 | 77 | 66.8 | 62.5 | 58.1 | 75 | 69.8 | 62.3 | 59.3 | 75 | 69.8 | 62.3 | 59.3 | 75 | 69.8 |
| June 23 | 65.1 | 67.6 | 63.9 | 60 | 75.7 | 67.2 | 63.8 | 60.1 | 75.9 | 70.3 | 63.8 | 60.1 | 75.9 | 70.3 | 63.8 | 60.1 | 75.9 | 70.3 |
| June 30 | 67.1 | 68.5 | 63.8 | 60.4 | 76 | 68.2 | 64.1 | 60.6 | 77.8 | 71.7 | 64.3 | 60.6 | 77.8 | 71.7 | 64.3 | 60.6 | 77.8 | 71.7 |
| July 7 | 71.3 | 72.4 | 67.4 | 63.3 | 80 | 71.9 | 67.6 | 63.5 | 80.7 | 74.8 | 67.4 | 63.5 | 80.7 | 74.8 | 67.4 | 63.5 | 80.7 | 74.8 |
| July 14 | 73.8 | 74.9 | 64.9 | 65.7 | 83.5 | 74.6 | 70.1 | 66 | 84.5 | 77.7 | 69.9 | 66 | 84.5 | 77.7 | 69.9 | 66 | 84.5 | 77.7 |
| July 21 | 71.8 | 73.6 | 71.4 | 68.1 | 80 | 73.1 | 71.4 | 68.3 | 80.9 | 75.9 | 71 | 68.3 | 80.9 | 75.9 | 71 | 68.3 | 80.9 | 75.9 |
| July 28 | 70.7 | 72.6 | 70.4 | 68 | 79.6 | 72.3 | 70.5 | 68 | 79.2 | 74.9 | 70.7 | 68.1 | 79.2 | 74.9 | 70.7 | 68.1 | 79.2 | 74.9 |
| August 4 | 70.4 | 72.4 | 70.7 | 68.3 | 77.9 | 72.4 | 70.7 | 68.4 | 76.8 | 73.8 | 70.7 | 68.3 | 76.8 | 73.8 | 70.7 | 68.3 | 76.8 | 73.8 |
| August 11 | 67.1 | 64.1 | 68.4 | 66.9 | 73.9 | 69.1 | 68.5 | 66.9 | 73.9 | 70.3 | 68.3 | 66.9 | 73.9 | 70.3 | 68.3 | 66.9 | 73.9 | 70.3 |
| August 18 | 65.1 | 67.4 | 67.4 | 66.4 | 69.5 | 67.1 | 67.3 | 66.4 | 69 | 67.8 | 66.9 | 66.4 | 69 | 67.8 | 66.9 | 66.4 | 69 | 67.8 |
| August 25 | 62.5 | 66 | 65.9 | 65.2 | 70.8 | 65.6 | 66.1 | 65.7 | 71.5 | 68.2 | 66 | 65.3 | 71.5 | 68.2 | 66 | 65.3 | 71.5 | 68.2 |
| September 1 | 64.2 | 67.1 | 66.2 | 65 | 71.2 | 66.7 | 66.4 | 65.4 | 71.6 | 68.8 | 66.2 | 65 | 71.6 | 68.8 | 66.2 | 65 | 71.6 | 68.8 |
| September 8 | 60.4 | 64.6 | 64.9 | 64.4 | 66.9 | 63.6 | 65.1 | 64.4 | 67.7 | 65.8 | 64.7 | 64.4 | 67.7 | 65.8 | 64.7 | 64.4 | 67.7 | 65.8 |
| September 15 | 58.6 | 62.4 | 63.1 | 62.9 | 63.7 | 61.8 | 63.3 | 63.2 | 64.6 | 63.4 | 63 | 63.1 | 64.6 | 63.4 | 63 | 63.1 | 64.6 | 63.4 |

HORTICULTURAL AND FORESTRY ASSOCIATION. 121

| | | | | | | | | | | | | | | |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| September 22 | 51.8 | 56.2 | 60.3 | 61.4 | 61.6 | 61.6 | 61.7 | 61.7 | 61 | 62.6 | 61.5 | 61.4 | 61.6 | 61.6 |
| September 29 | 49.9 | 54.4 | 58.6 | 60 | 60.3 | 60.8 | 60.2 | 60.3 | 57.8 | 60.2 | 59.8 | 59.8 | 60.4 | 60.9 |
| October 6 | 50.9 | 53.5 | 56.9 | 58.4 | 58.9 | 60.1 | 58.5 | 59 | 56.2 | 57.6 | 57.6 | 58.1 | 58.9 | 60 |
| October 13 | 43.6 | 47.9 | 52.8 | 55.7 | 57 | 59.1 | 52 | 55.8 | 51.5 | 53.3 | 53.3 | 55.6 | 56.9 | 58.9 |
| October 20 | 41 | 44.8 | 50.2 | 53.6 | 55.1 | 57.8 | 48.5 | 49.5 | 46.9 | 49.4 | 51.1 | 53.5 | 55 | 58.1 |
| October 27 | 38.3 | 42.4 | 46.9 | 50.6 | 52.6 | 56.8 | 45.1 | 46.3 | 43.5 | 46.1 | 47.2 | 50.3 | 52.5 | 56.6 |
| November 3 | 38.1 | 41.1 | 45.7 | 48.8 | 50.8 | 55.2 | 49.2 | 45.3 | 44.7 | 46.9 | 46.8 | 49 | 50.8 | 55.3 |
| November 10 | 33.1 | 37 | 41.4 | 46.3 | 48.9 | 54.2 | 36 | 37.1 | 34.6 | 37.3 | 40.8 | 47.9 | 48.7 | 54.9 |
| November 17 | 30.8 | 33.6 | 37.1 | 42.1 | 45.3 | 52.3 | 31.5 | 33.1 | 31.9 | 33.8 | 36.9 | 42 | 45.4 | 52.3 |
| November 24 | 29.5 | 32.7 | 35.9 | 40.3 | 43.3 | 50.6 | 31.5 | 32.5 | 31.7 | 33.0 | 35.7 | 40.3 | 43.3 | 50.5 |
| December 1 | 30.9 | 33.4 | 36.0 | 39.4 | 42.1 | 49.0 | 30.9 | 33.6 | 32.9 | 34.1 | 36 | 39.5 | 42 | 49 |
| December 8 | 29.0 | 31.5 | 34.3 | 38.2 | 41.0 | 47.8 | 30.9 | 31.5 | 30.9 | 31.8 | 34.2 | 38.3 | 40.9 | 47.8 |
| December 15 | 28.1 | 30.8 | 33.4 | 37.3 | 39.9 | 46.7 | 30.6 | 31.0 | 31.0 | 31.2 | 33.4 | 37.2 | 39.9 | 46.6 |
| December 22 | 29.2 | 31.3 | 33.8 | 37.0 | 39.3 | 45.7 | 31.5 | 31.6 | 30.8 | 32.0 | 33.7 | 36.9 | 39.3 | 45.7 |
| December 29 | 26.8 | 29.7 | 32.2 | 35.4 | 38.2 | 44.5 | 28.1 | 29.3 | 27.8 | 29.7 | 32.1 | 35.9 | 38.3 | 44.9 |

January 11, 1889, 9 a. m.

The Association met pursuant to adjournment.

The minutes of the session held January 10, were read and approved.

On motion duly made and seconded, that portion of the minutes relating to the discussion in reference to the admission fee was ordered eliminated from the minutes.

SECRETARY SHAW presented the credentials of MESSRS. E. F. BARTHOLEMEW, JACOB HAVER and BOWMAN as delegates from the P. D. H. Association, Pueblo, and, on motion duly made and seconded, MESSRS. BARTHOLEMEW, HAVER and BOWMAN were received as such delegates.

DR. SHAW moved that a committee of three be appointed on nomenclature of fruits. The motion was seconded and carried. MR. FAUROT nominated MR. ACKERMAN and MR. BROTHERS as members of the committee.

DR. SHAW nominated JESSE FRAZER.

On motion duly made and seconded, the three nominees were appointed to constitute the committee on nomenclature.

PROF. CASSIDY then presented his report on Botany and Entomology.

DISCUSSION.

MR. FRAZER: I dissolve one pound of lye in two gallons of water and wash the limbs with it when troubled with blight. In a week or ten days I repeat the process. In three days' time the leaves change color, and I save some that look as though they were entirely lost. This wash opens the pores of the bark and sweet-

ens the sap. I generally use the lye when I trim my trees in April, and especially apply it to the cut limbs. I use concentrated lye. In June, when the trees sometimes look as if they would die, I use a stronger solution which I apply to the trunks and larger limbs.

DR. SHAW : Then your theory is, that this blight is a sort of blood poisoning.

MR. FRAZER : Yes, the heat of day and chill of night sours the sap.

DR. SHAW : You apply this alkali then to counteract the acid.

MR. FRAZER : Yes.

LEVI BOOTH : How do you apply it?

MR. FRAZER : I put a cloth on a long stick, and use it as a mop.

DR. SHAW : How do you catch the moths?

MR. FRAZER : Two years past, I have used a patent lantern to catch the codlin moth.

S. R. PRATT : What kind of lantern do you use?

MR. FRAZER : My lantern is a tin basin containing a lamp ; the basin is filled with soap suds ; the glass surrounding the lantern dashes them into the suds. One night I caught so many that you could not see the soap suds.

DR. SHAW : As I understand it, the worm crawls, but the miller has wings and can fly.

MR. FRAZER : Yes.

MR. BROTHERS : Where is the worm now?

MR. FRAZER : Under the bark ; they form a cocoon and hatch like silk worms.

DR. SHAW: Then it is only in the butterfly stage that it is troublesome.

MR. FRAZER: Yes.

MR. GIPSON: I do not deny that we may catch troublesome insects in this way, but I think we will also catch those which are our friends. It is better to spray the trees at the proper time, as recommended by PROFS. COOK and PUNELL. Eastern fruit growers do not generally use this device.

MR. EASLEY: I sprayed my trees this year with Paris green. It is a cheap and effectual remedy. I made two applications, one week apart, and saved the crop, destroying only the enemies.

MR. EASLEY: What is the bogus chintz bug?

PROF. CASSIDY: This bug appeared last season. It sucks the juices and does not feed on the stems, so that arsenic is not effectual. A kerosene emulsion is the best treatment, applied early in the morning or late at night, as the bugs are very active at midday. This bug will give us trouble. The emulsion must be applied at once.

A paper by Mrs. Bain, of Pueblo, entitled "The Culture of Roses," was then presented by MISS PATTON.

DISCUSSION.

MRS. A. L. WASHBURN: Is black mountain soil poisonous to roses? If so, why?

JUDGE W. B. OSBORN: My wife has had considerable experience with this question and has come to the conclusion that the black soil from the mountains is too porous and dries out too rapidly.

D. S. GRIMES: Dingee & Conrad use only the coarsest kind of sand and never use the same soil twice. They have sixty greenhouses and are the largest rose

growers in the country. Roses require a compact soil. I had intended trying the richest mountain soil but will think better of it.

MRS. A. L. WASHBURN read a paper, "Two Summers in a Garden."

After Mrs. Washburn's paper, J. S. McCLELLAND read a paper entitled "A few Bugs." The paper was as follows:

Mr. Chairman, Ladies and Gentlemen:

When your Secretary gave me the horrid subject of "Bugs" to discourse upon he must have known my knowledge upon this subject was extremely limited. He perhaps thought that, like so many writers for the agricultural press, I was better qualified on that account, or rather less hampered by preconceived ideas or practical knowledge thereby. And he doubtless intended to caution me to brevity, concentration, shortness; and I really intended to be brief, but finding there is so much I don't know it may take some time to tell it all. Some years ago I listened to a lengthy lecture upon "Milk," and the only reference made to the lacteal fluid was contained in a tumbler on the desk. So if not confining my remarks entirely to the insect tribe, but trace relationship to the *genus homo*—the two-legged animal—I know you will pardon me, providing I do not tread upon your own favorite corns.

Perhaps the better known species of bugs are the *Cimex lecturlarius*—undoubtedly so named for its fondness for being present at all "curtain lectures"—and is vulgarly known as the bed-bug; and the *Doryphora 10-lineata*, the potato bug. The latter is said not to be a true bug at all, but a beetle, a pretender. I am inclined to this view myself for we all know how voracious pretenders usually are. If the former, the bed bug, could

be taught to confine its attacks to our helpers and then only at an early hour in the morning, it might be considered more beneficial than injurious to horticulture. There is certainly an opening here for great educational advancement.

Scientists might tell us that there is a corresponding variety of bugs to every variety of birds. We all know there are black birds and black bugs, yellow birds and yellow bugs, big birds and big bugs, golden birds and gold bugs, and humming birds and hum(ming) bugs. Although the name of the latter has been the victim of the American mania for abbreviation until you would hardly recognize it to be the same as the variety so industriously propagated and disseminated by the great Yankee showman as the humbug! There seems to be such a conspicuous and shining want of knowledge concerning this insect, or whatever you may call it, among our horticulturists, nurserymen and more especially tree peddlers, that you will pardon me for referring to it upon this occasion for a few moments.

This variety assumes so many forms, sizes, colors and shapes that to attempt to describe it in all of its phases would too severely tax my limited descriptive powers, so I shall not do so. However, twice each year, just previous to the semi-annual epochs of great horticultural activity, come immense, highly colored illustrations of impossible and glowing fruits and plants with descriptive letter-press in such gushing and irresistible language that at once convinces us that if we fail to immediately send for these wonderful novelties we shall surely miss a fortune. I will give you a few instances of what is being offered this season. To illustrate: We have two new strawberries recommended thus: "The great 'I have found it!' First time ever offered, and only by us. Berries $1\frac{3}{4}$ inches in diameter,

laying in heaps and piles on the ground." Of course all you have to do is to take a scoop shovel and gather up these heaps and piles as you would so much corn or potatoes. Then there is the "Gander's Pride," which challenges the world. Exceeding firmness, mammoth size, extreme lateness, handsome shape and color places it beyond competition. Seventy-three bushels sold for \$326.46 after traveling 140 miles to market." Now, is it to be supposed for an instant that a progressive fruit grower will go on growing the Crescent, Manchester, Wilson and Jucunda when we can procure plants which bear such large berries and grow in "heaps and piles" on the ground; or that other kind which is so exceedingly firm, mammoth, late, shape and color placing it beyond competition, and which will travel 140 miles to market to be sold at fourteen cents per quart! Away with such presumption.

But this is not the worst, or rather not the best. A veracious fruit paper of Rochester, that great center of fruit—and truth—says that one Davis actually grew the Jessie strawberry at the rate of 1,184 bushels, which is 37,888 quarts, per acre. And to prove that this is so, beyond question, it publishes Mr. Davis' picture. That, of course, settles it. But even at this our Green friend is not quite satisfied, so he says: "Supposing the Jessie plants to be one foot apart, and one pound to make a quart, the yield as grown by Mr. Davis would be 4,924 bushels per acre (157,568 quarts), or two feet apart, 1,184 bushels (37,888 quarts), or three feet apart the yield would be 526 bushels (16,832 quarts) of berries per acre."

Now, this is genuine encouragement for the novice to grow berries. At ten cents per quart, you see, you can take your choice of getting anywhere from \$15,756 to \$1,683 per acre. And then you all know that ten cents is a very low price here for strawberries, we should

get twice that at least. Moral—Buy the Jessie. Although our Green friend comes in latest he is by no means least, and he fairly outdoes the berries which grow in heaps and piles on the ground or those that will travel 140 miles to market at fourteen cents per quart.

Then for the market gardener we have a new prolific corn, which the learned "professor" swears will bear nineteen ears to the single stalk, and not only this, but it is improving in yield every year! What it will finally come to, there is no way of judging, but if there should be five or six stalks to the hill, it will soon reach the record of that new strawberry and produce heaps and piles on the ground. And no doubt it also will travel 140 miles to seek a market. Now, is there any such an old foggy anywhere who will go on growing kinds of corn which, at best, yield only one or two ears to the stalk when, for a few dollars, he can procure this kind which produces nineteen ears, and which is improving in quality as well as yield each and every year. Let us figure for a moment. We know our best corn-belt farmers claim to grow a hundred bushels and over of corn per acre, and the varieties they cultivate only produce one, and at most two, ears per stalk. But here we have a variety that yields more than ten times that amount, or for even numbers, say a thousand bushels per acre! Why this even beats the *Field and Farm* man who only grows fifteen hundred bushels of potatoes to the acre. Then, there is the cold and green melon which grows so large and is so delicious as to surpass all others, and anyone, after testing this melon, will not have a desire for any others. The illustration represents the ground so perfectly covered with the fruit that there is no room to step between them. But I shall not go any further with this, or else you will all

have these wonderful novelties as well as myself. No doubt many of you bought for two dollars or so per dozen the "Jumbo," or "Latest of All" strawberry, only to discover, after coddling it a year or so, that it was the old Cumberland, which we were glad to sell at three or four dollars per thousand; or, may be, the "Park Beauty," which soon turned out to be the old Crescent re-named, or was it a spurious and ridiculous "Big Bob," or a worthless "Stymon's Early" blackberry, or "Crimson Beauty" raspberry, at five dollars per dozen, not as good as a score of varieties which we furnish all comers at a couple of dollars per hundred; and all from the same old Quaker.

Then it may take the form of the "Great Fall" grape which clusters, weighing (in the picture) a half dozen or so pounds, and the bunches so numerous and close together as to almost obscure the earth, sea and sky! The price was only two dollars a vine when you took a sufficient stock to plant two or more acres! But you were only required to pay ten per cent. down and the balance could be paid with one-half the fruit grown upon the vines for five or ten years. Upon these extremely liberal terms you dared not propagate any vines from your own wood, and were obliged to pay \$20 per hundred for vines no better than the Concord, which you could get for about the same price per thousand, and you would still have to give half the fruit for a long term of years. Doesn't it look probable that there was a bug of the hum variety troubling those vines!

In order, probably, that this bug may not become extinct, old varieties are each year renewed and sent out as new and valuable acquisitions. Especially is this true as to strawberries. Now, if these things can be done in the green, what will be done in the dry; or if these things can be carried on inside the regular trade

by responsible men, what is or can be done on the outside by the "tree missionary," as he is sometimes called by his employers. Some most astonishing things I can assure you. Some months ago I was accosted by a sleek-looking, oily-tongued stranger who wanted to sell me some blackberry plants. He assured me they were perfectly hardy, evergreen, would grow forty feet and bear twenty-five pounds of fruit the first season. This he would guarantee. I tried in vain to cut down the growth to thirty-nine feet in an unfavorable season or when we had no water; to estimate the amount of fruit at twenty-four quarts and a pint when the birds rooted up the vines or tramps made an unusual growth, but he would not. Then I insisted that a few of the leaves might fall off or the tip of one vine be killed when the thermometer fell to 150° below zero, but he was obdurate. As he had been in the State nearly two months of course he knew they were hardy, for it is a well recognized rule here that those with the tenderest feet know the most regarding fruit in Colorado. After a little figuring I wanted to know why he traveled around selling such wonderful plants at the ridiculously absurd price of a dollar apiece, when by planting them he could realize from \$5 to \$7 from the fruit of each vine in a single year, and when he informed me he was making this great sacrifice for the good of the community I "tumbled to the racket," as the slang phrase is, and the procession moved on! Without the aid of a powerful telescope an ominously blue atmosphere could be discerned hovering over his retreating form for a mile or more. However it may be with the ten *lineata* *Doryphora*, this was a true humbug of the species *Swindularius*. Although many of my neighbors are said to have bought this wonderful blackberry, yet strange as it may seem, my Wilson's and Snyder's still have the

Fort Collins market and I have never been able to even see a berry of this wonderful fruit.

One of the very men who could not afford to pay a dollar to join this society has recently invested a hundred dollars in trees upon which to grow cranberries for market. Like the evergreen men who bought the wise blackberries—I mean the wise men who bought the evergreen blackberries—he will be a wiser if not a sadder man in the sweet subsequently. Grapes which will not kill back in winter, strawberries which late frosts cannot injure, plums which the curculio cannot puncture, apples which the codlin moth cannot infest, are a few of the latest novelties now appearing in the northern counties, and they have been delivered the past autumn. Yes, in the year of grace, 1888. A person might be led to suppose that the presidential election had not yet taken place and these fruits had been invented by some free trader to show that protection was not necessary.

Budded apple trees grown on French crab stock, which are warranted never to get black-hearted are being largely sold to the innocents. But if there is anything the tree peddler especially delights to lovingly dwell upon after he has taken your order for a pair (he always sells high-priced articles in pairs) of rose trees, each warranted to produce twelve or more varieties of the most beautiful roses as large as a quart cup, it is of his hybrids and new Russians at a dollar or so per tree. He will furnish you these hybrids upon perfectly hardy stocks and will give his invaluable guaranty to bear almost any kind of fruit you may desire from a Japan persimmon to a swamp huckleberry. And it seems to be a fact that there are people who will pay their money upon the guaranty of these limber-tongued strangers whom they have never before seen and are not likely to see again. O humbug, how many suckers are caught in thy name!

So-called Colorado-grown apple trees are delivered up our way every season, often said to come from Denver, with the very dark bark and familiar moss patches which so clearly indicate the land of their growth. Look closely under those patches of moss and you may find indications of a bug—the hum bug. These fellows are even now selling a new hedge plant with thorns a foot or two long, which bear abundantly all manner of the finest fruit, perfectly hardy and wonderful both in tree and price—especially price. These fellows almost equal the genius who was around a few years ago selling seed which would produce a species of the most delicious oysters in our alkali lakes. If we but shut our eyes we can still hear the hum of these bugs in our ears. They are as soft and mealy as the cottony cushion scale, as sedate and sanctimonious as the praying monks, and as ravenous as the potato bug or Mormon grasshopper.

One of the latest novelties is the tree blackberry at \$5 per pair, with illustrations much resembling the famous Russian mulberry humbug. Look out there, or you may see that large bug hidden under the familiar large fleshy yellow root. Times being hard, some of these fellows become ambitious and enter politics, devoting their energies to convincing the people of Colorado that a reduction of the duty on lead, which would shut down so many of our silver mines, would be the proper caper, but their success was not alarming; they had better stick to their hybrids and Russians.

Yes, there is the psuedo agricultural press which, on the shortest notice, can answer you the most difficult questions, such as those which have for years vexed the fruit grower. Men who have never planted a tree either for shade or fruit, can tell you how to do it; when, where and what varieties to plant. Not long ago, one of these gentry published a list of fruit trees for Colo-

rado, and when I asked his authority for such list, which contained many tender sorts, he named a very intelligent gentleman from the extreme western portion of the State away over on the Pacific slope; and this gentleman had then been less than two years experimenting even there.

This editor is always astride of more or less hobbies, and he rides them with a will. One time it is saving the third crop of alfalfa for seed, which is to make the farmer rich; then, fattening hogs on the same forage plant; then, deep plowing, subsoiling, ensilage, growing root crops, onions, fast horses, big horses, medium horses, the dairy, etc., etc., each of which he is sure, for a couple of weeks or so, is just the one thing needful. He, oh, so easily, grows 1,500 bushels of potatoes, or seventy tons of beets, to the acre; three to four tons of alfalfa at each of three or four cuttings, from the same amount of ground—and there really seems to be no limit to the number of bushels of apples, wheat, oats, onions, etc., which he can grow to the acre—in his office. And what a mania he has for big estimates of crops, big corporations and fast horses. "Why," says he, "I would sooner walk than ride behind a horse which needs a whip." A very farmer-like expression. Communications which exaggerate crop reports are welcome, but those which lower his estimate—well, he has no room for them. No, you are wrong there. I didn't say he was trying to humbug the people, but you are each permitted to form your own opinion. Look close for the bug, it may be covered with real estate.

As strange as it may appear, these bugs sometimes make their way even into our legislature, and when a proposition is made to grant aid to some great industry like horticulture, how economical our Solons get, but when a new office is to be created which a politician is

supposed to be able to fill, or some friend's salary is to be raised, or the clerks given extra pay, the economical fit has passed, and even the pages are ready to cry humbug.

This profound and learned scientific disquisition on a few bugs—a very few bugs, indeed—has been already too long, but it has distracted our attention for a few moments from the serious discussions of the day, and I trust we can again take up the important questions with more zest and profit than if this digression had not been made. If anyone shall be prevented hereby from squandering some hard-earned dollars on these impossible and over-wrought fruits and plants, and thus not only escape losing their money, but from failure and discouragements as well, the time spent will not have been a failure, nor will horticulture be a loser thereby. No humbug in that.

J. S. McCLELLAND moved and E. MILLESON seconded, that the election of officers take place at 2 p. m. The motion was carried.

S. A. OSBORNE read a letter from Ex-Governor Furnas of Nebraska, secretary of the Nebraska State Horticultural Society, who had seen this exhibit of fruit; he complimented it highly, saying it would compare favorably with other states.

S. A. OSBORNE offered the following resolution, and moved its adoption:

WHEREAS, the interests of agriculture, including thereunder horticulture and forestry, are about to receive at the hands of the General Government, the recognition that their importance demands, in making it a distinct department of the Government, and its head a Cabinet officer; and recognizing, as we do, in Ex-Governor Furnas of Nebraska, a man pre-eminently qualified for the position and one whose

interest in and knowledge of the subject, as well as his eminent public service in that behalf, fairly entitles him to that distinction; therefore, be it

Resolved, by the Colorado State Horticultural and Forestry Association, That we respectfully request and earnestly urge upon President-elect Harrison, the appointment of Governor Furnas as Secretary of the Department of Agriculture.

Dr. SHAW seconded the motion, which prevailed.

JANUARY 11, 1889, 2 p. m.

Association met pursuant to adjournment.

The first thing in order was the election of officers.

MR. BROTHERS nominated C. S. FAUROT for President.

MR. ACKERMAN nominated W. B. FELTON for President.

There were twenty votes cast, of which MR. FAUROT received thirteen and MR. FELTON seven. MR. FAUROT was declared elected President for the ensuing year.

W. E. PABOR moved that the Secretary be instructed to cast the vote of the Association for W. B. FELTON for Vice-President for the ensuing year.

The motion being duly seconded, was carried and the vote cast as ordered.

LEVI BOOTH moved that the President be instructed to cast the vote of the Association for ALEXANDER SHAW for Secretary for the ensuing year.

The motion, being seconded, prevailed, and the vote was cast by the President for MR. SHAW, as instructed by the Society.

On motion of J. S. McCLELLAND, WILLIAM DAVIS was elected Treasurer of the Association for the ensuing year by the ballot of the Secretary.

The Executive Committee was then elected for the ensuing year, composed of the following members: MR. BROTHERS, MR. TOBIAS, MR. BOOTH.

MR. FAUROT came forward and thanked the Association for the honor conferred upon him, and pledged himself to do the work of his office to the best of his ability.

On motion of MR. McCLELLAND, MR. FAUROT'S paper entitled, "Needs of Legislation in the Interests of Horticulture," was presented.

DR. SHAW moved that a committee of five, of which the President shall be chairman, be appointed by the President, to whom shall be referred all matters concerning legislation; that committee to report to the Society.

The motion was seconded by MR. BOWMAN, and carried.

DISCUSSION.

MR. BOWMAN: In order to get the support of the Southern delegation, Arbor Day must be appointed before April 15th. We cannot go beyond the middle of April for Arbor Day, as the leaves are all out by that time. We can plant trees in February.

MR. DEWEESE: I would suggest that two days be appointed, one for the Northern portion of the State and one for the Southern.

MR. BOWMAN: I think about the middle of April would suit all sections of the State; it is not a good plan to divide the State.

MR. BOWMAN: The Southern part of the State has lost about fifty per cent. of the trees planted on Arbor Day, because it is not the right season for tree planting in that section. The South is willing to yield as much as the North.

MRS. WASHBURN moved that two of the five members of the Committee on Legislation be women.

The question on being put to vote, was lost.

DALL DEWEESE, of Cañon City, presented the following paper on "The Growth, Culture and Sale of Nursery Stock":

This subject was assigned me by our worthy Secretary, who notified me in due time, but owing to other pressing business, I have not given it the thought and consideration it deserves before placing it before our State Horticultural Society. However, I will state in as brief and practical a manner as possible, my real and practical experience with this subject in Colorado.

This subject is probably more appropriate for an association of nurserymen, and I will deviate somewhat indirectly from it, to more especially benefit the planters of nursery stock, after it has been nursery grown. I have been frequently asked, "does nursery stock grow equally well in arid Colorado as it does under the moist influence of the atmosphere of our Eastern states? To the question I can answer unhesitatingly, "Yes." Our soil in Colorado is so varied in its character and general composition, that it is necessary for nurserymen to practically understand what elements of the soil promote best growth in different species of plant life, and in what kinds of soil do these elements exist, and which one predominates. The most of my nursery soil, in its main body, consists of red clay, with enough granite sand to prevent baking; it is strongly impregnated with red

oxide of iron, lime and potash, or vegetable mould ; then by adding well composted stable manures to get the ammonia, and by deep and thorough cultivation, the growth of trees, vines and plants then obtained is certainly encouraging, and cannot be surpassed in any other State in our Union.

I will ask my hearers to pause a moment, then tell me what other State in our Union has better possibilities for profitable fruit raising than Colorado. Look at the geographical location of our State, as to its latitude, and as a commercial center, then look below an altitude of 7000 feet, and see the many valleys and plains which comprise tens of thousands of acres of fertile lands, strongly impregnated with all the elements necessary to promote vigorous, healthy growth of trees and plants. I have visited every fruit locality of commercial note, in each State east of the Rocky Mountains, from Utah to Nova Scotia on the east, from Manitoba on the north to Florida and Texas on the south, and I say that as a general fruit producing state, Colorado stands A No. 1. Had I thought any other State better, I would have gone to it when I left my native State (Ohio). But returning to the first word of my subject, we ask, what starts and sustains growth? We will take a piece of a limb of last year's growth, five inches long, a root same length and size, make a splice or whip graft and place it in the ground. In the spring, under a uniform degree of heat and moisture, a callous and cells are formed, caused by the life-giving influences of the sun and scion as positive, and the earth and root negative, or heat and moisture, these cells germinate into life, fibrous roots spring forth, dissolve and absorb proportionately from the mineral kingdoms of the earth the properties necessary to promote growth and to perpetuate its variety. This is unvitalized sap, which then.

ascends the scion through the inner wood, reaches the leaf-bud which has already commenced to open ; this sap is here vitalized, the leaves being the lungs, and absorb from the carbonic acid gases of the atmosphere in combination with the dissolved minerals of the earth in their fluid state, enlarges the leaves and encourages the upward growth of the terminal bud, and a further development of leaves. This sap descends from the leaves between the inner bark and the wood, and builds up new tissues, forms new cells and buds that will germinate for another year's growth and fruitage.

I notice that trees and plants with large leaves are especially successful in Colorado ; for an illustration I refer you to the following hardy apples : Tetofsky, Transparent, Oldenburg, Wealthy, Wolf River and Ben Davis, and all these have leaves above the average. I believe that in this high altitude with thin atmosphere, that the large leaved varieties have more absorbing capacity, which aids greatly to their success as good bearers. In my visits to different fruit localities this fall and winter through our State, I find the orchardists highly satisfied with the growth of their trees ; the bodies are smooth, with good, bright, healthy color, the branches grew from two to six feet, and the wood matured to the terminal buds ; the whole tree looks healthy from root to branch, with no symptoms of leaf or limb blight south of the fortieth degree of latitude.

• I can show seven-foot growth on two-year-old trees in my nursery for this past season, with ripened wood, yet these Eastern tree agents will tell our fruit planters that Colorado nurserymen are all "ignoramouses ;" they tell you we can't grow trees in Colorado, that we don't know how to irrigate, that our trees are not matured, that we have no trees, that we buy all our stock from them, and so on, etc., etc. They tell it so

nicely that some planters believe it all. I want to say that I was in the business in Ohio before coming to Colorado, and I find that the conditions and influences in our high altitude, hot sun, dry atmosphere and our irrigation, causes fruit stock to acclimate very differently in Colorado than in our Eastern States. We have a finer texture of wood, of higher color, a more compact stocky growth, and being acclimated to our peculiar climate, they will and do certainly give better satisfaction to our home planters, and hundreds will testify to this fact. The grower of nursery stock should be ever on the alert; he should be observing and practical; know when to sprout his seeds; practice the best methods of grafting and budding; know when and how to strip his trees; how to form their heads of each species, then do careful grading before shipping, so that when his trees pass into the hands of the purchaser they will be of uniform size in their variety, and look as though they had come from a practical grower. I have seen thousands of trees delivered in this State that looked as if they had been split from a brush pile. But one fact I want to mention, and the planters should always remember it, all varieties of apple trees and other species as well, are not good growers in the nursery row; if you order several varieties of apple trees two years old, do not expect each variety to be as large as the other, some are good free growers while others are moderate, or of dwarfish habit for the first three or four years, and some are always so. Some of our best varieties are poor nursery growers, such as Tetofsky, Oldenburg, Wealthy and some others. In planting an orchard do not set out too many varieties; confine your selection to a few of the best; if you are not familiar with different varieties and their adaptation, leave the selection with your nurseryman, he is then responsible for your orchard.

Culture for nursery stock in Colorado is the next word in my subject.

Experience here has taught me that this branch of the business differs considerably from general cultivation in the East, and through experiments each year, better results often develop, which change my former system of cultivation. To condense this part of the subject, I will say that for both nursery and orchard, sub-soiling is necessary, then a thorough irrigation; deep cultivation should often be practiced for the first two years, after which it should be more shallow near the roots as they should not be disturbed, but continue deep cultivation farther from the rows. I always keep the earth high enough along the rows, to keep the water from coming in contact with the trees or plants, as it has a tendency to soften the bark and cause sun-scald, the cambium will become black from sap-sour, the bark will peel off, and often kill the tree; always use a long and narrow tooth cultivator; by using such an implement the soil will become loose and smooth on the surface—this is of great importance, as the evaporation is much less and a more uniform degree of moisture is maintained, less irrigation is required, the ground will become warmer, which results in a more vigorous growth to our trees or plants; irrigation is sometimes easier than cultivation, and I have frequently seen fruit growers using water in their orchards when the cultivator would have been the best irrigator. My observation prompts me to say that in most cases too much water is used and not enough deep cultivation. As I have said before, growth is excited by warmth and moisture, and if we keep our soil cold and clammy by too frequent irrigation, we retard growth.

Some of my hearers are anxious to ask, how do we know when to irrigate? To this I will answer, that there is no infallible rule, as some soils, as well as fruits, require

more water than others : a clay soil requires more water than a sandy soil, because sandy soils are smoother on the surface, and lie closer after cultivation, and retain moisture longer, while a clayish soil lies more open, and exposed to our hot sun and drying winds. Examine your soil in the orchard, and if a ball can be made from the earth with your hand, six or eight inches beneath the surface, it is wet enough, no matter if you irrigated last week or last year. Strawberries, of course, require frequent irrigation, as they are surface feeders and root shallow ; in short we must use judgment, for the greater part of true knowledge of cultivation and irrigation must be ascertained by the grower on his respective soil.

The sale of nursery stock in Colorado for the past six years has been large, and I believe would aggregate to \$400,000, while thousands of trees have been lost by careless handling on the nursery grounds or become frozen or dried out from long shipment; there have been equally as many perished after they were delivered to the purchaser. It is so easy to set the bunch in the cellar or in a back shed, or hurridly half leave it in the ground, until we return from a three or four day's visit to our neighbors.

Never order trees unless you know the nurseryman is reliable, and when he notifies you that the trees will be delivered on a given day, go yourself, if possible, if not send some trusty person, examine the trees, see that they come to your hands in good condition, and have your ground ready to receive them; if your shipment is made in the fall, have the trench ready to bed them down, root and branch; if shipped in the spring and your order is large, trench them, soak the ground down around them thoroughly, and plant at once. The greatest evil to our planters in this State to-day, is the number of fraudulent and unscrupulous tree agents,

with their misrepresentations and fancy fictitious varieties, in high colors at from one to two dollars apiece, they present their card, which tells of their one to three hundred acre nursery and the \$50 to \$300,000 capital which they represent; if they have been in the State but five days they can tell you what varieties are succeeding best in any locality; they can tell you exactly what you want, and they have always got it; their greatest energies are devoted to trying to sell you specialties, something new and rare, something that they *alone* can furnish, and, as a rule, it is something that no *reliable* man would furnish; they do not, however, dwell upon varieties of new fruits of real merit, and offer them at the same price of a reliable grower, and seven cases out of ten they deliver some worthless, discarded stock. But while these sharks infest our land, there are reliable agents on the road and they are necessary as missionaries, for there are thousands of trees growing to-day in these United States, that would not be were it not for the persistent efforts of tree men. The fruit planters of our State should be protected, and this matter should be brought before the legislature this present session; laws should be enacted compelling nurserymen operating in this State, those of us who live in it as well, to give bond for the legitimate fulfillment of orders, and that when the purchased trees or plants come into bearing, they must be true to name.

DISCUSSION.

MR. GRIMES: If I were going to preach a sermon, I would select the text, "Cast thy faults upon others, for it shall cover a multitude of sins." There is nothing to protect a man against his own ignorance. We must educate the people; there are only five or six farmers in one hundred who take agricultural papers. The newspapers educate masses in the art of Horticul-

ture. The people who patronize the fraudulent tree men are as guilty as the men themselves.

DR. SHAW : One of the great evils is cheap trees. There is no economy in buying a cheap tree.

E. MILLESON then read a paper on "Culture and Management of Timber Claims," which was as follows :

After having received notice that I was expected to write a paper on the "Culture and Management of Timber Claims," I came to the conclusion that it was a subject that should have been assigned to some one that has had some practical experience in that particular direction. But on looking about among my friends, I could not find any one that was willing to take my place. To me it seemed that as the law is very applicable to Colorado, except where there is plenty of water to be had for irrigation. On investigation I find there have been 37,000 claims filed in our local land office, in the Denver district, and only about twenty-five titles perfected up to the present time. It seems that the greater number of filings that are made are made with a view to holding the land so that some member of the family of the claimant may become of age, or some friend will come to the State and secure the land by pre-emption or homestead. I have had counsel with a few timber culture claimants, and it seems to be the universal opinion that it is a very expensive way of securing a piece of Government land. Every one that I have counseled with has had his timber culture claim contested, and we all know how expensive all litigations in our courts are.

There are a few things that we will very briefly consider :

First—What to plant, when to plant, and how to prepare the ground, whether for seed, pits, nuts, cuttings or trees.

Deep plowing is an absolute necessity. Thorough pulverizing and plenty of water should always be on hand.

I should advise planting the fast growing trees in the beginning about ten feet in the rows, with eight inches to one foot apart in the rows.

I would advise planting Lombardy poplars, willows, and cottonwood from cuttings, in the first place; then in one or two years, plant on the same ground, midway between each row, the better quality of timber, such as oak, ash, hickory, walnut and a few others of the maple varieties.

I find the rock maple and ash leaf maple or box elder much hardier than the cut leaf or soft maple.

We must learn that we are making a great mistake in planting large trees and expecting a long-lived tree.

It is certainly contrary to the laws of nature to cut off all the top and nearly all the roots of a tree, and then expect an average life of such trees when planted.

Then you will say, we will have to plant small trees; in answer I say, "Yes, sir, by all means, plant small ones."

DISCUSSION.

S. ALLEN LONG: I purchased 15,000 trees last spring of a home establishment. Of the 15,000, there were 5,000 black locusts and 3,000 honey locusts, white ash, etc. I set them in rows about four hundred feet long, two feet apart. They never received a drop of water from irrigation, and all continued in a healthy condition. My land has a very heavy sub-soil which retains moist-

ure. The Douglas county commissioner considered them the best he had ever seen grown without irrigation.

The committee appointed to report on the most desirable apples for a person about to plant an orchard to select, through its chairman, DR. SHAW, reported as follows:

Summer Apples—Tetofsky, Red June, Yellow Transparent, Duchess of Oldenburg, Alexander, Red Astrachan, Sops of Wine, Cole's Quince.

Fall Apples—Wealthy, Fameuse, Hass, Autumn Strawberry, Jeffries, Richard's Graft, Striped Gilliflower, Utter's Red, Plum Cider, Jonathan, Bailey's Sweet, Sweet Pear, Rambo.

Winter Apples—Ben Davis, Wine Sap, Walbridge, Pewaukee, Geniton, Missouri Pippin, Rambo, Tallman's Sweet, Isham's Sweet, Perry Russet, Willow Twig.

On motion the meeting adjourned until 7:30 p. m.

January 12, 1889, 9 a. m.

Meeting met pursuant to adjournment.

DR. SHAW offered the following resolutions and moved their adoption :

Resolved, That this Association acknowledge our hearty thanks to the Denver Real Estate Exchange for their generous aid and assistance in furnishing us the use of Gettysburg hall for our exhibition and annual meeting, and also for paying all contingent expenses consequent thereon, and we especially thank the active members of the Exchange for their efficient and timely aid.

Resolved, That we highly approve of the correct and efficient manner in which Miss Grace Patton has reported our meetings, and as a stenographic reporter she takes a high rank among those of her profession.

The resolutions being duly seconded, were adopted.

MR. ENSIGN then read a paper by D. S. GRIMES on the subject of "Forestry." On motion the paper was referred to the Legislative Committee.

JESSE FRAZER withdrew from the Committee on Nomenclature and the name of DILL DEWEESE was substituted.

On motion the name of D. S. GRIMES was added to the Committee on Nomenclature.

E. T. ENSIGN presented the following supplementary report of the Legislative Committee :

Your Committee on Legislation begs leave to submit its supplemental report, as follows :

Bills for act to establish Arbor Day, to amend sections 1 and 2 of chapter 110 of the General Statutes of Colorado, relating to trees, and to authorize incorporated cities and towns to establish and maintain public parks and boulevards, are herewith submitted for the action of the Association.

2. An incompleated draft of a proposed joint memorial to Congress, asking for proper legislation for the preservation of our native forests, is submitted to your body, with the recommendation that it be referred to the new Committee on Legislation whenever that committee shall be duly constituted.

All of which is respectfully submitted.

Signed, NELSON MILLETT,
EDGAR T. ENSIGN,
S. A. OSBORN,
Committee.

DISCUSSION.

MR. HAVER : For the southern part of the State, the third Friday in April is too late to plant trees. The 10th or 15th is the latest we can set out trees.

MR. PARSONS : The third Friday in April seems rather late, the second Friday would be better.

MR. FAUROT : The northern part of the State doesn't feel like giving way entirely to the southern part.

MR. HUBBARD : The third Friday in April will suit Las Animas county as well as any other.

MR. HAVER : You will cut off the southern part of the State entirely if you put Arbor Day as late as the third Friday in April.

MR. ENSIGN read a paper on "Needs of Legislation on the Forestry Interests of Colorado."

Professor DAVID O'BRINE read the following paper, entitled "Topics on Chemistry Germain to Horticulture."

Last year I told you how soils were formed, what changes they passed through from rocks to soils. I gave you a list of the elements, as far as known, that are regarded as essential to the proper growth and development of the plants, what special function each element possessed ; in other words, I attempted to give you the chemistry and geology of the soil.

To-day, I propose to speak to you from the farmer's standpoint, or the practical view of the soils.

The solid earth on which we live, and from which we draw our sustenance, consists of material existing in two essentially different physical conditions, as rocks and soils ; one being more usually the surface decked with verdure, teeming with animal and vegetable life, and supplying us with all the requisites of happy existence ; the other forming the unyielding foundation on which the great superstructure rests, here and there protruding above the surface as cliffs of seashore, rocky ledges, or summits of hills and mountains. There is a constant change of condition between these two forms. All soils having been produced by the disintegration of rocks, and being capable of re-conversion to the former condi-

tion again, and both forms are recognized as geologically forming new variations in form of one material considered as rock, consolidation being regarded as a merely accidental circumstance.

We are commanded by Job (v-23) to be in league with the stones in the field. While there are many things about rocks and soils that we do not understand, we can say in the language of a faithful student of nature :

"Nature never did betray
The heart that loveth her."

Ignorance is the greatest enemy agriculture has to contend with, and our knowledge of the soil will increase with the intelligence of the farmer who cultivates it. When we open our eyes and see the beauties and wonders of nature that surround us, we are surprised with the number and variety of changes through which our soil passes ; we see in it the plant food as a chemical element, inert and useless it may be ; we see it again in the plant, soon formed into food for man and beast, and we see it again as manure returned to Mother Earth, from which it came to go on in this same ceaseless round. From a chemical and geological standpoint the elements that we use to-day have been used a thousand times by those who have preceded us, and will be used equally as many times by generations yet unborn.

What a thought to contemplate ! The rocks changed into soil, the soil changed into plants and animals, and to see the same elements, beauty in the poet's brain, strength in the blacksmith's arm, or beef on the butcher's block, until we can say with Hamlet : "Man may fish with the worm that hath eat of a king, and eat of the fish that hath fed of the worm."

Holland's Bitter Sweet has the same thought,

• "Life evermore is fed by death,
In earth and sea and sky;
And that a rose may breathe its breath,
Something must die."

"Earth is a sepulchre of flowers,
Whose vitalizing mould,
Through boundless transmutation tower
In green and gold."

"The oak tree struggling with the blast,
Devours its father tree,
And sheds its leaves and drops its masts,
That more may be."

The soil of your farm is valuable only as it contains plant food. You must remember this plant food in the soil is constantly changing in amount and in relative proportions. Now upon the surface and again passing downward with the rains to be again saved by the physical actions in the soil, and by the agency of plant roots.

The amount of plant food may be exhausted by the plant in a few years, or it may last for a life-time without diminution.

The next question is, in what does the soil exhaustion consist? It must consist either in the removal of certain materials from the soil, materials which served to feed the crop and become part of it, and which by being continually taken off, harvest after harvest, become diminished in quantity so that after a certain time there is not enough left in the soil to produce a fair crop, or it means that the materials which may still exist in the soil no longer occur in a soluble form, or in that condition in which the crop may make use of them. You may have a soil that contains any of the essential plant foods in large quantity, but if this plant food is there combined with some mineral which is acted upon so slowly

by the natural process of solution, that there is no available food, that the plant can get hold of, such a soil would be unproductive. Again, your farm may have a soil that does not contain 1-100 part as much plant food, but which is fertile from the fact that the food is in such a state as to become available¹ as rapidly as the crop in question may require it.

If I could apply to it a medical term and say to cure this disease of the soil we must either restore this plant food which has been removed from the soil or we must change the state of those which still exist there, so it may become available. Chemical science has established the fact that every crop requires a variety of materials to support it, and that these materials must be supplied in the proper quantity and form in order to have a proper plant and an average yield. Every soil has a natural fertility and this is measured by the crop that may be grown out of the plant food which is liberated each year by the atmosphere and other natural actions or agencies in the soil, as rain-fall, etc. The soil contains the elements of plant growth in different proportions and conditions—some elements in great abundance, others in limited quantities, just sufficient to support a scanty growth, or in some instances, absolutely wanting. When the farmer adds dung or chemicals to his soil he is adding this plant food, and besides there is a chemical action taking place between them and the soil constituents.

In the presence of moisture, the soil has the power of decomposing a great many of the chemicals which are applied to it, and it has also retaining or selecting power. Some of the elements of plant food are firmly held and are not subject to loss through drainage, and have a limited diffusibility; potash is a good illustration of this, while ammonia is less strongly retained and has a

ready diffusibility. The amount of your crop will largely depend upon the proportion present and diffusion of these elements.

The waste of fertility in your land arises from drainage and the character of the sub-soil. The plants are like the animals in their growth and development. They require different proportions of plant food, and different combinations at different periods of their growth. If certain elements of plant food are in excess, the growth of a plant is materially influenced; the depth of your plowing, the character of the sub-soil and the kind of crop will give rise to various kinds of plant food. The different classes of plants have peculiarities in their feeding arrangements which are very marked and striking. If you will take the trouble to compare the roots of our ordinary crops, you will find that when they grow under similar circumstances, there is a great difference in the depth to which they extend; a great difference in the degree in which they branch, and a great difference in the absolute quantity of roots. We have not very many satisfactory observations on these points to serve us in any very extended comparison, it being rather troublesome to make accurate observations of the roots of plants, when they have penetrated the soil. A few experiments by Schubart and others—Schubart separated the roots from the soil by the following expedient: An excavation was made in the field to the depth of six feet and a stream of water was directed against the vertical wall, until it was washed so that the roots of the plants growing in it were laid bare. The roots thus exposed in a field of rye, in one of beans and in a bed of garden peas, presented the appearance of a mat or felt of white fibers to a depth of about four feet from the surface of the ground. The roots of winter wheat were observed as deep as seven feet in a light sub-soil forty-seven days

after sowing. The depth of the roots of winter wheat, winter rye and clover was three to four feet. He further collected and weighed the roots of wheat, rye and peas and ascertained their proportions of the entire plant. The observations of Hellreigel, on the extent of the roots of barley and oats are very interesting—it is hoped that some day the station may take up this subject and enable us to determine the comparative quantity and depth of the roots of our cultivated plants with some degree of accuracy. There are a great many problems which enter into the calculation—the different soils, the different treatment, the manure or fertilizer used, etc.

When the soil is rich the roots tend to remain ; they branch and ramify through all the pores of the small bulk of earth. When the land is poor they stretch off and are sparsely distributed through a larger space. When they find plenty of food they grow and multiply upon it ; when nourishment is lacking they seem to go in search of it. All observations must therefore be comparative. We know, however, in a general way, that the development of roots is different in different classes of plants. We know that when the soil is rich at the surface and where it is adapted naturally by its mechanical condition to the growth of, say wheat, the large proportion of wheat roots will be found in within a narrow space. In some countries, as in Saxony, very shallow plowing will do. If the soil has nourishment and moisture six or eight inches of earth will answer for the support of a crop. A foot will, in a majority of cases, where the soil is of good quality, contain the bulk of the roots of the wheat crop. They may go deeper, as Schubart observes, but only because they must descend in order to find food or drink, has been shown by experiment that roots developed in poor soil in the vicinity of any enriching materials. So that we cannot say

because Indian corn roots have been traced for twenty feet in a sand bank that it is the habit of the maize plant to send out roots twenty feet long, the length depends upon the soil rather more than upon the plant. The roots are in one sense the most important part of the plant; we cannot influence a field crop except through the roots. We do not manure the tops or operate upon them in any way.

All our efforts to promote growth must be directed to the roots and yet we do not know with exactness what is the extent and depth of the roots of the wheat plant compared with the roots of any other plant. Dr. Weiske, of Prussia, in the government agricultural school measured off certain plats of land several yards in size and carefully excavated the soil to the depth of ten inches, and with extreme care dug out all the roots he could find in that depth of soil. These he dried, weighed and analyzed and these figures show the average of his results, calculated in pounds upon the surface of an acre. It is supposed that crops were good (see chart) the stubble was rather short. In Heiden's experiment a mass of soil one foot wide, ten feet long and four feet in depth was enclosed in boards, then lifted out and the roots removed by careful picking and washing. The average length of the roots was noted and the total weight of roots and tops ascertained. (See chart No. 3.)

The benefits to be derived from the chemical examination and analysis of the soil, are by many misunderstood. Some have represented it as the only sure guide to successful cultivation; while others have not scrupled to pronounce the analysis of the soils to be entirely useless and unfitted to lead to any profitable practical result; both of these extreme parties are in error. For while it is often very difficult from an analysis alone to explain either the past agricultural history, the present money

value, or how best to remedy the known defects of the soil yet there are many practical points on which analysis does throw light, and the modes of practical treatment which it serves at once either to discourage or recommend. The per cent. of lime, organic matter and many other elements are desirable to know. The results of chemical analysis answer the following questions: Whether the barrenness is caused by the presence of an injurious substance as sulphate of iron in peaty and clayey soils; whether soils contain common salt, nitrates, and other soluble salts in small or large quantities; whether barrenness is caused by the absence or deficiency of lime, phosphoric acid or other important elements of plant food; whether the clays are absolutely barren and not likely to be materially improved by cultivation, or whether they contain the necessary elements of fertility in an unavailable state and are capable of being rendered fertile by subsoiling, deep cultivation, etc.; whether or not clays are usefully burnt and used in that state as manure; whether or not the land will improve by liming; whether it is better to apply lime or marl or clay on a particular soil; whether special manures, such as superphosphates or ammonical salts can be used, of course discreetly, without permanently injuring the land; or whether the farmer should rather depend upon the liberal application of farm-yard manure, that he may restore to the land all the elements of fertility removed in the crops; what kind of artificial manures are best suited to soils of various composition. Chemical analysis cannot give any information in regard to barrenness of soil on the following questions:—

1. Whether barrenness is caused by defective drainage.
2. To what extent sterility is affected by a bad physical condition of the land.
3. How far unproductiveness is affected by the climate.
4. That a soil is barren simply because there is too little of it; or that it is

unproductive simply because a thin surface soil rest on a stiff clay subsoil of great depth,—what is the relative productiveness of different soils.

It has been truly said, there are many uncertainties about soil analysis, but even supposing there were no objection and we could in addition secure a reliable chemical method to give the available elements of plant food in the soil, a new difficulty presents itself of procuring a reliable sample of soil for chemical examination; such a sample that will represent accurately the field from which it was taken. When it is considered that a single field may contain half a dozen distinct varieties of soil, and a single square rod as many as two or three, it is utter folly to suppose that *one* sample, considering that it does represent the locality from which it comes, can possibly show the composition of other portions of the field or even an average of the whole. We see, therefore, that it would not be wise to depend entirely upon the chemical examination of the soil to guide us in the application of fertilizing ingredients.

I have often been asked, could a competent chemist tell exactly what to put upon the field to make anything grow? Well, a competent chemist can generally tell what to put upon a field without making an analysis; plenty of good manure will help in almost any case. An example will best illustrate what I mean. One hundred pounds of Peruvian guano of the old-fashioned kind will make a difference between a good crop and a poor crop, when it happened to be applied to the right land, with the right crop and right weather. This 100 pounds contains about fifteen pounds of nitrogen and fifteen pounds of phosphoric acid, and three pounds of potash; these thirty-three pounds of ingredients constitute fertilizing value alone. We will suppose it is evenly distributed over the land, an acre of land one

foot deep will weigh about 4,000,000 pounds. Thirty-three pounds of fertilizer and 4,000,000 of soil, assuming that the crop got all its nutriment from the first foot of ground are the two quantities which, put one over the other, the smallest at the top and a line between, make the fraction which the chemist must figure down to, if he will find out from an analysis of the soil what element of fertility that soil is deficient in, viz.: $\frac{33}{4000000}$ equals $\frac{1}{121000}$. But, in fact, if the chemist in two analysis of the same sample of soils gets results which agree within $\frac{1}{10000}$ he is lucky, and his luck does more towards that result than his skill, for usually the $\frac{1}{10}$ of one per cent. or $\frac{1}{1000}$ is about the limit of accuracy in chemical analysis. It may thus easily happen that the chemist cannot by analysis distinguish between two soils, one of which has had a dressing of 1,000 pounds of Peruvian guano to the acre and the other nothing.

The history of soil exhaustion is simply a history of the rise and progress of our race. The first man was a horticulturist, and the earliest husbandry was simply pasturing; when the people of temperate climates found they could not support themselves by killing wild animals and gathering fruits, the natural products of the country, they began to tame animals and keep herds of cattle, sheep, etc., and you know that on the vast plains of Asia and South America this sort of pastoral husbandry is still the only one known. As people became more numerous and land more valuable people crowded each other, and there was not room enough to roam about at will and settle upon pasture wherever it could be found—for a change, the people fell to fighting and partially killed each other off, thus leaving land enough for the survivors as is seen in the case of the tribes of Reuben, Gad and Manassa. In the slow progress of civilization, it became necessary to cultivate forage plants.

and to take some care of the natural meadows—people began to break up and cultivate the ground, with various crops of grain and roots. We must know that this grain and roots could not compare with a like kind in our day. It is not possible now to show through what slow and laborious steps this improvement has taken place in any given locality.

If we do not know it for any special country, we know it was the development of husbandry all over the world. Farmers have carried on their operation in a very simple way for many generations; possibly the reason that greater advancement was not made in agriculture was due to the fact that agriculture was left to slaves taken as spoils in war, and that the gentleman of the period was a soldier. Later, an oratory took possession of their minds, and it is but a few centuries ago that any attention was paid to agriculture or horticulture, and then only as a means for procuring food for the soldier in time of war. As late as the middle of the eighteenth century Thomas Gray wrote the *Elegy in a Country Churchyard* :

“The curfew tolls the knell of parting day,
The lowing herd winds slowly o'er the lea,
The plowman homeward plods his weary way,
And leaves the world to darkness and to me.

“But knowledge to their eyes her ample page,
Rich with the spoils of time, did ne'er unroll,
Chill penury repressed their noble rage,
And froze the genial current of the soul.”

The first change in the mode of farming was the rotation of crops. When rotation was started we do not certainly know; some think it started in England, but Virgil and Varro both speak of the Romans being well acquainted with rotation. After a time there came into use in Europe a system which was practiced there extensively in the ninth century, and is still followed in some

parts of the Continent. It was known as the "three course system of rotation."

For centuries this system was carried on when the farmer had large pasturage and a little plow land. The first year plow land was left in fallow, but in the autumn was prepared by what manure and rough tillage could be given it. For sowing of winter grain, mostly rye, which occupied the second year. The third year the ground was put in summer grain, which completed the shift. This is practiced in Europe, in some places, to the present day. The rotation of crops was made the subject of legislation in the time of Charlemagne. Some historians think that this monarch decreed the adoption of the three years shift, others think that he merely recommended it as an improvement on what had been previously the custom among the less advanced peasants, of simply using the plow for a succession of years without any rest for the land. In Great Britain, Germany and European countries this system of rotation is carried on; on the other hand, here are places where the land has been cultivated for years with but little diminution in the crops. In Hungary, South America, the Black Sea, wheat is proverbial; the Genesee Valley in Central New York, the river bottoms in Ohio, are other examples. Mr. Laws, of England, had an average yield of sixteen bushels of wheat for twenty-six years; he had twenty bushels of barley for eighteen years, and a yield of two thousand, seven hundred pounds of hay for fourteen years in succession.

I have hurriedly sketched the causes of soil exhaustion and the circumstances that gave rise to it, I have shown both sides of the vexed question of soil analysis. I have traced some of the rise and progress of rotation of crops, or a better system of farming.

In looking over the bulletins of the different experiment stations I am surprised to see what a great proportion of the chemical work is devoted to the analysis of fertilizers, to my mind it speaks volumes ; it paves the way for the solution of the problem of soil exhaustion.

In the language of the poet,

" I found a well half covered down the lane,
That was so deep and clear that I could see
Straight through the world into another sky."

The alchemists were searching for the philosopher's stone, something that would change the base metals into gold ; the modern chemist is searching for something that will change the very rocks into bread. There is no very great difference between them. The alchemists were right in one sense ; there is a philosopher's stone, but that stone itself is a compound of labor, perseverance and genius, and the gold, which it produces, is the gold of true knowledge, which shall never grow dim or fade away.

PROF. A. E. BLOUNT read the following paper on " Root Crops."

The cultivation of the root crops in the United States, in the East and in our own State in particular, is of vastly more importance to the farmers than they are aware of. Their value is not realized. In England and on the Continent also, the root crops come in for a large share of attention as a cheap and very profitable article of food. There is no lack of expenditure in labor and fertilizers in order to produce the largest possible yield. In Canada they are extensively grown for cattle and sheep.

It is admitted by all that the Eastern States cannot profitably raise grain—not enough for home consumption even—but root crops are a wonderful success, hence

they are grown and fed with the grain imports from the West. With hay and their root crops they sandwich the ration in such a way as to put upon the market about the best and juiciest meat in our land. Now, the West cannot only raise grain in abundance but roots of all kinds as well and as profitably as in any section. All who have given the subject any attention will bear me out in this statement.

It is a mistake to suppose that root crops are not profitable for us to raise, in more ways than one. They are most excellent appetizers, promote health, keep off disease, and withal are a very nutritious food as I shall attempt to prove.

The cost of raising roots is but little more than that of corn, in fact when we take into consideration the exhaustion of the soil, the labor, and the condition in which preceding crops leave the soil, the root crop is fully as cheap, and at the same time as profitable.

With these preliminary remarks I shall proceed to discuss—

First—The root crops best for us to raise.

Second—Their value as compared with other products.

Third—Manner of cultivation, yield and saving seed.

First, the root crops best for us to raise : In the list of vegetables for table use and for stock feeding are beets, turnips, potatoes, carrots, parsnips and artichokes.

Of beets we have several kinds ; white, yellow, sugar and at least ten varieties of the mangel wurzel, all valuable and excellent for food.

Of turnips there are many kinds of the English white and yellow, and the rutabaga of several kinds.

Potatoes are very numerous and one of the most productive and valuable foods for stock.

Of carrots there are the long orange, white and yellow Belgian.

For stock, all the domesticated animals, the beet stands at the head of the list for stock food in yield and in value. It is the only vegetable, by the way, that will grow in our alkali soils ; it produces enormous crops and can be kept the year round without fear of frost or decay. On account of the sugar certain varieties contain they are not only an excellent food but a valuable root, as is shown in its analysis for the manufacture of sugar. In trials made to test how many can be grown on an acre it was found by Peter Henderson to be as high as seventy to seventy-five tons per acre of mangels.

Next to the beet come turnips, which are held in high estimation, not only for stock but for table use. The varieties of the White English turnip are many, varying in size, growth, flavor and quality. All are excellent for stock. But the best turnip is the Swede or Rutabaga, more valuable to the farmer because of its hardy qualities and more nutritive elements, its greater yield and better keeping qualities.

For cattle and horses the carrot supplies a deficiency in the daily ration no grass or grain can satisfy. It gives appetite, seasons the diet, and assists in giving tone to the digestive organs. Within a few years the Belgian carrots have been added to the other root crops on account of their very prolific character and good feeding qualities.

The parsnip, though not generally raised for stock, is found to be equally as good and valuable for fattening purposes as the carrot, and it is one of the most nutritious roots. Economically considered it contains :

| | |
|----------------------------------|------|
| Water | 82.1 |
| Flesh-forming elements | 1.2 |
| Fat-forming elements | 7.0 |
| Accessory elements. | 8.7 |
| Mineral elements. | 1.0 |

The parsnip is, perhaps, the hardiest of all the bien-nial root crops. It endures the coldest weather out doors, seeming to grow better and sweeter for the exposure. For strictly fattening purposes no root is more valuable than the Jerusalem artichoke, but although all who have had any experience in its culture and use, agree in pronouncing it of a very high utility, its culture to a greater extent than all other roots is neglected. Its analysis economically considered is as follows:

| | |
|---------------------------------|--------|
| Water | 76.000 |
| Accessory elements | .277 |
| Flesh,forming elements. | 1.000 |
| Fat-forming elements | 18.800 |
| Mineral elements. | 1.000 |

Possessing, as artichokes do, in fattening principles to the remarkable extent of nearly nineteen per cent., their value when used in connection with foods whose constituents are more nutritious, is very evident. The reason of their non-culture in some States, is the difficulty of eradicating them from the ground when once planted—the very thing which should commend them to us, certainly. For hogs, they should be raised on every farm.

Second—Their value as compared with other products.

In the consideration of this subject I shall enter extensively into the merits of the root crops in respect to the place they occupy or should occupy as a nutritious food. Many are inclined to the opinion that roots do not fatten or even make flesh, that they merely serve as an accompaniment to help digestion and perhaps appetite. In winter they are a substitute for green pasture,

supplying the place of grass, and other green vegetable matter upon which stock feed during the spring and summer. For cows, an Ohio farmer found one acre of sugar beets equal in food to ten acres of oats, and they saved his cows from many ills and diseases heretofore prevalent and fatal. This statement is corroborated by many more of like import. The analysis of the root crop made by different chemists may differ in minor points, but in the main they agree, showing how nutritious roots are.

If we take a ton of hay as a standard, we find 100 pounds of it in the laboratory of the chemist, and practically too, in the cow's stomach, equal to about 333 pounds mangel wurzels, to 300 pounds rutabagas, 200 pounds of potatoes and 250 of carrots. These facts are verified by numerous experiments in practical stock-feeding. The largest yield of mangels on record raised by a farmer, that I have noticed, is $55\frac{1}{2}$ tons per acre, at a cost of $6\frac{1}{3}$ cents per bushel. The producer says, "the crop is much more reliable than turnips, not being affected by dry weather. Their value, for feeding cattle and swine, I find after three years' experience, is of the highest utility—an acre more than equalling two acres of corn in an average season."

JUDGE LORING'S crop of mangels cost him $9\frac{1}{2}$ cents per bushel and his 48 tons on $1\frac{1}{8}$ acres were equal to 12 tons of hay.

The editor of the *Prairie Farmer* says, "beets should produce at the rate of 1,400 bushels per acre, and the leaves of half of them stripped off of them in time will feed a cow at night and four hogs principally during the summer and fall, and give four bushels per day for feeding for six months in a year, enough to fatten one cow and feed another for milk." If this is anywhere near the truth (and I have no reason to doubt such eminent

authority) I think many of us are losing much by not giving more attention to the cultivation of the mangel. Another illustration to show the value of mangels and what can be done with them prepared in another form : Eight tons were pulped and in twenty-four hours kiln dried ; in drying, they lost seven tons ; of the one ton of dried beets, 800 pounds were fed to five sheep in twenty weeks ; at the same time, they fed on the aftermath of $1\frac{1}{2}$ acres of poor pasture ; the amount of dressed meat made was 165 pounds, worth \$24.20. Deduct \$7.26 for the $1\frac{1}{2}$ acres pasture, and the net gain or value of the the 800 pounds of dry material was worth \$16.94, much more than they are worth when fed green.

The comparative value of the mangels alongside of the other beets and varieties, used as cattle or stock food, economically considered, may be seen in the following table :

| MANGELS. | LONG RED. | SHORT RED. | ORANGE GLOBE. | |
|----------|-----------|------------|---------------|-------------------------|
| .82 | 85.18 | 84.68 | 86.52 | Water. |
| .9 | .48 | .44 | .36 | Flesh forming elements. |
| 13.6 | 9.79 | 11.96 | 10.24 | Fat forming elements. |
| .4 | 4.55 | 3.82 | 2.88 | Accessory elements. |
| 3.1 | ..... | ..... | ..... | Mineral elements. |

According to such analysis and by actual experiment, 400 pounds of mangels are equivalent to 100 pounds of hay. For the production of milk, 355 pounds of beets would be equal to 100 pounds of hay. The leaves of mangels are of as much nutritive value as the beets themselves, and in England they possess, it is said, a higher value both as a food and a fertilizing substance ; in fact, it is claimed in a chemical point of view, they are three times as valuable as the roots ;

from the analysis given in the table above, it will be seen that the fat forming elements are very largely in excess of the nitrogenous, and compose nearly thirteen per cent. of the entire root. In Europe the value of the sugar beet is better appreciated than with us. It forms one of the great table products, and is extensively used, not only in the manufacture of sugar but for fattening cattle, and it is quite a favorite with dairymen.

To show the effects of feeding roots and the better qualities of mangels, when compared with turnips, two steers, alike in all respects, were fed—one on rutabagas, the other on mangels. The ration of hay being the same, the steer that consumed the ton of rutabagas gained $48\frac{1}{4}$ pounds, and the other on mangels gained $65\frac{1}{2}$. To prove this fact more conclusively, the roots were exchanged, the steer having had the rutabagas was fed on the mangels, the other on the rutabagas. The result in this case was, that the mangel feed steer made $36\frac{3}{4}$ pounds gain and the rutabaga feed steer $15\frac{1}{2}$ pounds per ton of roots fed.

This experiment, to be made more conclusive and satisfactory, and to show that the mangels were the better food, both animals were fed on equal quantities of mangels, gaining 50 pounds each for the ton consumed.

Chemical analysis and practical tests prove beyond a doubt the superiority of the mangel wurzel over all other root crops.

Before leaving the beet, a few words on the sugar beets may not be out of place.

The mangel wurzel is that variety which, when cut crosswise, presents alternate layers of white and red color, more or less distinct, and is grown in Germany and France extensively for the manufacture of sugar. It is better than the white or Silesian beet, because it

yields much more per acre, but the Silesian contains a higher per cent. of sugar and a lower per cent. of water and saline matter—a combination of properties which makes it more valuable to the manufacturer. It is also more hardy and less liable to be injured in the harvesting and handling.

The beets grown at the College this year for the purpose of testing the quantity and quality of sugar they might contain, are of four kinds: Excelsior, Lane's Imperial, Vilmorin and Improved Imperial.

The first contains 9.58 per cent. or 191.6 pounds of sugar per ton.

The second contains 12.8 per cent. or 256 pounds of sugar per ton.

The third contains 11.39 per cent. or 117.8 pounds of sugar per ton.

The fourth contains 8.83 per cent. or 176.6 pounds of sugar per ton.

Compared with the sugar beets grown in other countries and states, these four raised in our soil and climate by irrigation make a very flattering record—a showing better than can be found elsewhere. The yield per acre is exceeded by no other State or Country, and the per cent. of saccharine matter is only exceeded by France and Spain, where the sugar beet industry has assumed large proportions. The yield, however, in these Countries is but a little more than half the estimated yield on the College grounds, hence the advantage we have over all other sections in raising the sugar beet. The manufacture of beet sugar in our own State will not long be neglected. It is an industry we should by all means encourage. Our dry climate, fine soil and the facilities with which we control the application of water—just enough at the right time—enable us to excel in this

industry. The single experiment made at the College puts this industry in a clear light, and shows that certainly twenty-five per cent. more sugar can be made of Colorado grown beets than is made elsewhere. All we need is the appliances, the plant and the beets to begin the manufacture of our own sugar.

The next most valuable root for feeding purposes is the turnip, particularly the rutabaga. It is a sun crop and will thrive on much less water and on much poorer soil than beets. Rutabagas grow longer and produce more weight per acre than any of the white varieties. They are a better feed for cattle, cows and sheep. Many instances might be given where with hay and rutabaga more fat was made than with hay and grain. The average amount per acre in this country is about twenty-five tons. When compared to hay they are estimated three to one, which would make thirty-two tons. Rutabagas have a feeding value worth an equivalent to 18 $\frac{7}{8}$ tons of hay.

In considering the chemical composition of the root crop the first thing that strikes one unaccustomed to analysis is the very large amount of water they contain—nearly nine-tenths, so that, for instance, in the case of the rutabagas, cattle must eat 100 pounds of roots to get eleven pounds of dry food. The dry substance of the roots consists of feeding material soluble in water, as sugar, a large proportion of pectin or jelly-like substance, as well as more valuable flesh forming materials. It also contains a smaller quantity of insoluble matters, all which, except the woody fiber, are digestible and nutritious. The rutabaga contains less water than the white turnips and consequently more feeding material, which when dry contains a larger proportion of flesh forming substances, hence the superiority of the rutabaga over the white turnips.

In considering the question of raising and feeding roots there are some other suggestions worthy our attention besides merely the value of the root itself as an article of food ; the expense of raising, the facility of growing and the amount of crop harvested are very important considerations. If one kind of a plant yield 30 per cent. more than another of flesh forming substances, nitrogenous or non-nitrogenous, and the other produces 50 per cent. more than the first in quantity ; or if it can be produced at half the cost of the first ; or if it is always a sun crop, while the first is subject to various casualties of the season, noxious insects, etc., and consequently uncertain, then it is manifest that the one richer in flesh forming or fat forming qualities should yield to the other.

There is certainly nothing in our soil and climate to hinder our raising roots as cheaply, abundantly and as easily as in any other State either for feeding purposes or the manufacture of sugar. Their quality is certainly of the best and in quantity so far as tested they are quite equal to that of any section of ours or other country.

For horses and cows the carrot is one of the most valuable vegetables to raise. It has been cultivated for centuries and has always been regarded as a most important root crop, but the question for us to decide is will it pay? It is not a profitable crop to raise when labor is high. It requires too much weeding and fine work. The experience of nearly all who have raised carrots is not favorable to them. The comparative value of carrots for milk is not equal to mangels or even to sugar beets. Their weight is less, yield not so great, their shrinkage during the winter more, and their keeping qualities not so good. For us, carrots are too slow growers.

Their real value may be illustrated in the following:

Twenty tons per acre have been raised at about \$75.00, and by actual experiment five pounds of carrots and six pounds of oats mixed, were equal to ten pounds of oats alone. For working horses an acre of carrots supplies a quantity of food equal to sixteen to twenty acres of oats.

Economically considered, the analysis of carrots shows them to contain:

| | |
|----------------------------------|------|
| Water | 87.5 |
| Flesh forming elements | .6 |
| Fat forming elements | 6.6 |
| Accessory elements | 4.3 |
| Mineral elements | 1.0 |

It will be seen that the fat forming elements surpass the nitrogenous to such an extent that the other food is absolutely necessary to give this root its highest value. Carrots improve the cow's milk both in quality and quantity, making it richer and of a better color.

Third—The cultivation, yield and saving seed. The root crops require much skill in their cultivation and a great deal of attention and care to make them a success. In the first place the soil must be in the most favorable condition, fertile, finely pulverized, and free from all coarse material that may keep the soil from packing closely about the seeds. Poor soil poorly prepared and dry, noxious insects, and careless culture are drawbacks that cost more than the cultivation and harvesting of the entire crop.

The best, but by no means the cheapest way to secure a good stand of beets is to first plant the seed in hot beds or cold frames and when large enough, transplant as we do cabbage. In this way a whole month can be gained and many more can be produced on the same land. Such a system pays in the end. The principal

difficulty in sowing turnips by hand or even by a hand drill is, they come too thickly in bunches and spots, provided the seed is good. Poor seed on the other hand don't come up at all. It lacks vitality and consequently all that germinates produces degenerated roots, small, stringy and strong.

Carrot seed is still worse to handle successfully, and parsnips no better. In our soil, where it is generally so dry, the possibility of getting a stand year in and year out, is very rare, mostly on account of the absence of moisture. Even when the soil is irrigated before sowing and put in fine order, seeds fail to come up as you want them, and to irrigate after sowing seldom secures a stand of anything. The preparation of the soil for the seed of root crops should receive very careful attention. Clay soils should be made fine and free from all lumps, well fertilized, with fine rolled manure that has no straw or coarse material in it, and when the seed is sown the soil should be warm and quite damp to secure quick germination.

Some people steep seeds before planting to hasten germination. This is a bad plan in our dry climate, unless water is at hand to prevent dry weather from checking the early growth. Whether root crops should be sown on ridges or flat ground is a question of great importance. On clay soils by all means sow in ridges, because the water will form no crust to prevent the seed from coming up, neither will there be any chance of having the atmosphere cut off. On sandy soil the seed does better to be sown simply in rows, with a small irrigating furrow between. Flooding tender annuals often injures them. All rooted plants are better when they take up water from below instead of on the surface, or even laterally.

Fully from twenty-five to fifty per cent. of the success in the production of all root crops depends on having good seed. For our climate, soil and methods of cultivation we should raise all our own seeds, because they are better in all respects than any we buy from other States. They are superior, because they are acclimated, better suited to our soil and attending conditions, having become, as it were, inoculated by the elements of soil, water and the atmosphere.

The difference of vitality of our home grown seeds and the same seed purchased of New York and other seed houses would certainly surprise you. All kinds raised this year on the College farm have scored a vitality of eighty per cent. and over, while all others sown beside them and under the same treatment, obtained from India, Austria, Australia, New Zealand, Russia, Scotland, Egypt, and from our own States, fell below seventy per cent.; some even as low as twenty-three per cent.

Market gardeners of Colorado prefer Eastern seeds, I am told, because, they say, they ripen earlier than the seeds grown here. The reason of their ripening earlier is quite manifest. On ripening they always pick the fruit end ripe for market and leave the last for seed. What wonder the gardeners prefer Eastern seeds. Should they save the first, reversing the present custom, they would find home grown seed would not only ripen as early, but would be much better in many ways than imported seeds.

There is more science in selecting and saving seeds than any one would naturally suppose. Selecting and saving the proper seed often, and I might say always, insures a good crop, other things being equal. I might go further and assert for a fact that our own seed will often double our crops.

In selecting and saving beets, turnips, carrots and parsnips for seed, they being bi-ennials, good and fair specimens should be very carefully taken up before frost, wrapped in several thicknesses of paper separately, and put into a deep pit, out of the way of frost, rain and snow. In taking up the roots the rootlets should not be injured, nor should the roots be bruised. In the spring they should be set out just as they grew in well manured mellow soil, and on ridges when the soil is clay. When coming into seed, that found on the middle stem of the panicle should be saved as the best. It is the best for various reasons—it ripens first, it is more nearly like the seed sown, it is more perfect, coming, as it does, from the center of the root, and receiving more nourishment from its parent. Mangels are fond of rich soil, the more the manure the larger the crop, but not always the better. They will grow on sandy loam down to clay, but are sweeter when grown on lighter soils; a heavy loam is best.

Turnips grow on all soils, from sand down through muck and clay. The rutabaga succeeds best on a heavy soil, and is sweeter.

DISCUSSION.

DR. SHAW : Not long ago I run across a smart Alex, professing to be a chemist, who stated that he had made analysis of beets grown in Colorado, and that there was not enough sugar in them to make sugar manufacture profitable.

PROF. BLOUNT : According to the analysis of sugar beets made at the College, there would be a great profit.

MR. EASTWOOD : Is there a probability that the mineral matter here would injure the sugar in the beet?

PROF. O'BRINE : No.

MR. HARRIS: Has the blister beetle injured crops here?

PROF. CASSIDY: There are two kinds which destroy the foliage of potatoes and beets. They may be destroyed by arsenical poisons.

MR. PARSONS then read a paper on "Colorado Forests," as follows:

COLORADO FORESTS.

All who take an interest in horticultural matters are more or less acquainted with the influences of forests upon the earth and its inhabitants. How they act directly upon the atmosphere in several ways: by producing a change in the electrical condition, so as to prevent and dissipate hail and thunder storms; by absorbing from the air the carbonic acid and other impure gases exhaled from animals or developed by decomposition, returning pure oxygen, ready for the support of animal life; by the direct elimination of the germs of disease from both atmosphere and earth, through absorption by leaves and roots; by checking rapid evaporation and thus equalizing the temperature of both earth and air, and by breaking up and dissipating the currents of air, no matter how fierce or violent; also how they act directly upon the surface of the earth: by equalizing the distribution of the rainfall, if not really augmenting it; by retaining in the soil most of the moisture precipitated; by accumulating and protecting the snow; by filling the springs and brooks and thus increasing the steady flow of the streams, and by preventing the terrible destruction of torrents and freshets.

All this you know, but do you realize that the forests of Colorado are more important to the growth and development of the state than those of any other part of America? You spend much money and labor in bringing water to your trees and crops, but do you realize that this supply of water is dependent upon the forests? You build large reservoirs and ask the National Government to expend millions of dollars in a general system of storage reservoirs for this dry region, but do you realize that in the forests we have natural storage reservoirs of vast extent, far more effectual than any that can be made by man? Do you realize that nearly one half of the forests of Colorado have been destroyed since the occupation of white men, and that without these forests the millions of dollars expended in irrigating canals and storage reservoirs would be utterly wasted. We glory in the growth of our cities and the development of our wonderful resources, but do we realize that if we do not preserve our forests, and even increase their area, this beautiful country will ere long become desolate and uninhabitable. Can we realize all this when we fail to stop the wanton destruction of the forests by tie-choppers, charcoal-burners, mines, saw-mills and fires, and allow the rejection of the bill presented to Congress for the preservation of the forests of the United States; or, realizing all this, have we the despicable feeling of that type of despotism, Louis XIV, when he exclaimed: "After us the deluge." But the deluge may come in our life-time if the present consumption of forests in this State continue, for they are disappearing at a fearful rate, and if once destroyed there will be small probability of re-forestation on these gravelly ridges and in this dry climate. Under the best conditions the second growth of a forest is slow, and a young tree has little chance on these steep mountain slopes where

the soil is exposed to the washing of torrents as soon as the large trees are removed.

These thoughts force themselves upon us as we turn towards the forests of Colorado and view at a distance their effect as a mass. But I will not now dwell upon this, perhaps their most important aspect, but will ask you to go with me into their midst—under the trees themselves—and consider some of their individual characteristics.

Colorado forests are confined to the western mountainous portion of the State, for the groves of cottonwood, box elders and willows along the water courses on the plains cannot be termed forests. The total area occupied by them is estimated at about one-sixth the area of the State, or 10,000,000 acres. But this area is not thickly covered as in other regions and some of it is too thin to tempt a saw-mill. Wide spaces occur called parks, which are either totally treeless or clothed only with a growth of slender aspens. The forests are heavier and denser on the northern slopes, where less exposed to the sun, the moisture remains longer in the ground. The larger and more important forests of the State are found on the Pacific slope, where there is more rain than snow. These forests rise from the plains to an altitude of 12,000 feet and consist almost exclusively of conifers. Here and there may be seen one or two species of poplar and a few other small trees or shrubs, but as a rule there is nothing to diversify the somber grandeur of the woods. The glory of the Eastern woods, oaks, elms, maples, walnuts and hickories are not seen here and the visitor to these regions feels in some different world, and taken back to some age of long ago. For geological investigation has shown that conifers are the pioneers of modern forests and were the first trees and at one time the only trees in existence.

The simple and primitive organization of the reproductive organs stamp them among the earliest of flowering plants, certainly the first of exogenous growth. This general coniferous nature of Colorado forests is the same in all high northern and high mountain regions. The circumpolar vegetation is to a great extent the same in America as in Europe. It sends its colonies southward on the high mountains or isolated peaks which rise like islands in an ocean and retain their identity or similarity of vegetation long after the great geological changes of past epochs have severed their immediate connection with the centers of distribution. Thus we find in the Rocky Mountains many plants which in a general way are familiar inhabitants of Europe and Asia, but yet are not exactly the same. For not a single pine, spruce or fir here is identical with those in the East or the Old World.

In Colorado there are twelve different species of conifers, and although they are found mingled together, and may all sometimes be seen in the mountains within a few miles of each other, they are not indiscriminately mixed, but occupy distinct and peculiar stations. Some may ascend to the mountain summits, others must halt at the foot.

The pine family is the most important and widespread in the State, and the first and foremost among them is the yellow, bull, or heavy-wooded pine, (*pinus ponderosa*) which begins where the plains and mountains join, and extends westward to the Pacific. It rises up the mountains as high as 6,000 feet altitude, where it mingles with the true mountain pines. It is easily recognized by its thick red-brown scaly bark, wide-spreading sub-pendulous branches and long stout leaves, nearly one foot long, of a deep glaucous green, three sheathed, rarely two sheathed. It forms a straight symmetrical

tree, reaching a height of about 100 feet. Its wood is generally coarse grained and resinous, hard, heavy and brittle, of a reddish color, with a handsome grain, and is largely employed for lumber, railroad ties, mining timber, and somewhat for interior finish. It is one of the hardiest of all pines, and the fastest grower, and being well adapted to dry, windy, and exposed situations, it is valuable for planting as wind-breaks and for timber. Its name, "Ponderosa," was given on account of its dense heart-wood which is so heavy as scarcely to float in water.

This is the first pine we meet as we enter the mountains, and as we travel on and reach a higher elevation, we find in certain localities on dry rocky ridges as high as 10,000 feet the more valuable Western white pine, (*pinus flexilis*), which is a handsome tree of compact habit, dark foliage, straight stem and smooth bark. Its height varies with the altitude, from a low scrubby bush to a tree fifty to sixty feet high. Its leaves are in fives, rigid, erect, and glaucous green. Its wood is white, soft and easily worked, closely resembling the white pine of the East, and is preferred for finishing and cabinet work. It is very hardy and though rather rare, its highly ornamental character and medium size especially adapt it for planting on the lawn. These two pines form the principal part of the pine forests of Colorado.

Penetrating still deeper into the mountains, and at higher elevations, we find the red, black or lodge-pole pine (*pinus murrayana*), which grows at an altitude of 8,000 to 9,000 feet. This is a symmetrical tree of conical outline and rapid growth, with numerous sub-erect or spreading branches. It is of moderate size, rising to a height of about thirty feet, with a slim tapering trunk a foot in diameter, and smooth greyish-brown bark, thin and scaly. Its leaves are two-sheathed and

of a bright green. The wood is soft, light, tough and coarse, liable to warp, and rarely cut into boards.

Still higher, one of the last trees to dispute with wild storms the possession of the Alpine domain, we find the foxtail or hickory pine (*pinus aristata*), a medium-sized tree seldom over fifty feet high, with thick trunk and variable form, generally, wide-spreading, open-headed, with long, flexible, drooping branches. Its leaves are five-sheathed, short, rigid, light green, very glaucous on the inner faces, forming tufts of foliage one foot or more long, at the ends of the branches, whence its name, "Fox-tail." Its wood is very hard and tough, of a reddish color and was used instead of hickory in the early days. Now it is employed in mining and to some extent for lumber. It is quite ornamental, and might well be planted in our grounds, in a light, dry or well-drained soil.

The pinion or nut pine (*pinus edulis*) grows only in the lower valleys and among the foothills of the southern portion of the State. It has been found near Colorado Springs, but it is rather far north for it. It is greatly prized for its seeds, which are about the size of a pea, sweet and excellent flavored, and gathered in large quantities. Its wood is light and soft, very resinous, extremely slow to decay and makes the best fuel in the world, being chiefly valuable for that purpose. For this reason great quantities are used for charcoal and its destruction is threatened for this purpose. It forms a low, roundtopped tree twenty to thirty feet high, and branched from the base. It is not very handsome, but its rugged, twisted, sturdy appearance gives it a certain attractiveness. It generally occurs in groves or scattering along the dry banks of cañons and in stony soil on the foothills and mesas.

Next to the pines in importance come spruces, which though not as valuable from an economic point of view, are more ornamental, and include some of the most beautiful species of conifers. The most common spruce in Colorado, and the one we find first on entering the mountains, is the Douglas or red spruce (*picea Douglassi*); also known by the various names of mountain hemlock, Oregon pine, red fir, yellow fir and swamp pine. This is the grandest of the group of giants, which combine to form the forests of the West, and is found from Mexico to Sitka and from sealevel to an altitude of 10,000 feet. It forms a gigantic tree, often three hundred feet in height, with reddish yellow wood, coarse but clear grained; hard, heavy, elastic and strong. It is exceedingly handsome as a lawn tree; rapid in growth, beautiful in form and color, with soft, dark green foliage, and flexible branches, sweeping gracefully downward and feathering out quite to the ground. I have seen large specimens on the lawn, which were the symbol of stately elegance.

Beginning at a higher altitude than does the Douglas spruce, and extending in large forests to timber line, is the Engelmann's white or red spruce (*picea Engelmanni*), the most valuable timber tree in the Rocky Mountain region. In the more favorable localities it makes a stately tree, over 100 feet high, forming a narrow, shapely, tapering spire of a darkish hue and most ornamental character. It becomes smaller as the altitude increases until on the highest summits it is a prostrate shrub. Its wood is white, tough, strong and elastic, neither knotty nor resinous. Nearly all the rough and dressed lumber used in the Rocky Mountain region is of this spruce. It is best adapted to inside work but when well seasoned and protected with paint can be used outside.

Growing amid the Engelmann's spruce at lower elevations, and often confounded with it, is the rare and exquisitely beautiful blue, white or silver spruce, named by botanists (*picea pungens*) from its pungent and sharp needles. This is one of the most attractive of all trees, faultless in beauty and of a remarkable silvery appearance which contrasts most agreeably with the sombre colors of the rocks and trees around it. It prefers a damp soil and grows rapidly in such situations, forming a symmetrical tree, 100 feet high, compact and pyramidal, with rich sage-colored foliage of a steel blue luster. Its wood is soft, weak and of little use. Its chief value is its ornamental appearance, and though other trees surpass it in grand and noble qualities, there are none that excel it in a peculiarly bright warm tone and pleasing appearance. It is greatly prized in the East and in Europe, and is sought for so assiduously in other countries, that more attention should be given it here.

The same may be said of the silver firs or balsam, which are the stateliest and most striking of all the trees in the Rocky Mountain forests, and stand pre-eminent as the grandest conifers of the world. There are only two species in Colorado, the white silver fir (*abies concolor*) and the balsam fir (*abies subalpina*). The latter is the less important, being a tall slender tree about 100 feet high, closely allied to the balsam of the East, and is found scattering as high as timber line, rarely forming forests. The wood is soft and light, possessing little strength. It forms a handsome tree, very attractive with its dark green foliage of a silvery hue beneath.

The white silver fir stands as an ornamental tree above all compeers. It grows in Colorado at an elevation of 3,000 to 9,000 feet, and is found in scattered

groups throughout the whole Rocky Mountain region. Spreading over so extensive an area it varies considerably in height and in the length and color of its leaves, which are generally long, incurved upward along the branches, flat, pale green and glaucous above, and of a light silvery color beneath, which gives it a magnificent appearance in the bright sunlight. It commonly grows to a height of 100 feet with soft, very light wood, little used for lumber. No tree combines so many of the requisites of a lawn tree. I cannot conceive of a grander, nobler and more inspiring sight in the vegetable world than one of these trees in the full maturity and development of its beauty, rising 100 feet or more, slim and straight, like a column of verdure, while the lights and shadows play around its large, graceful foliage, touching here the end of a branch with a silvery tint, and leaving the main tree in deep shadows of rich green hues.

The red and white cedars are both found in our mountains. The former is the more valuable and common, being one of the first trees on the foothills and is perhaps the most widespread tree in existence, stretching from the Atlantic to the Pacific. It is a small tree, seldom attaining a height of fifty feet, with the outside wood white and heart wood of reddish color and very durable, largely employed for cabinet work, fence posts, pencils, etc. It is one of the most useful trees of the forest and of great value both economic and ornamental. Its tapering and symmetrical form and bright rich green foliage make it a very attractive tree for any lawn, especially when a larger species would soon grow out of place. The white cedar or Rocky Mountain juniper is as ornamental as the red cedar, but not so desirable for wood, being less durable, though still very valuable. Only one deciduous forest tree is

found on the mountains of Colorado, the aspen or quaking asp, a common tree throughout the United States, and which may be seen in this State in large groves as high as 8,000 feet of altitude, in the parks on open spaces left by the conifers. It is a medium sized tree fifty to seventy-five feet high, with great height of trunk in comparison to its thickness. Its bark is smooth, hard, thin and whitish, and its leaves are set on very slender stalks which causes the peculiar trembling from which it derives its name. Its wood is white and soft, of a firm texture, like the white birch, and makes a good fuel. An aspen log holds fire longer than any other kind, a fact which is turned to account by the Indians in moving their camps. It is also said to be very durable as a fence post.

Of such are the forests of Colorado. Along the streams on the plains are found large groves of box-elders, and of narrow-leaved and broad-leaved cottonwood, with which you are all familiar. The cottonwood and aspens may be transplanted with the greatest ease under ordinary care, but not so the conifers, as many can testify who have tried them and failed. This is the reason we see so few of them.

Growing from seed in the shady cañons and on the protected hillsides of the mountains, they find the bright sunlight and strong winds of the plains very difficult to endure, and must be nursed and handled very carefully until they become accustomed and hardened to the new condition of life. The most difficult to remove successfully are the silver firs; next to these are the spruces, while the pines and the cedars are comparatively easy. But because they are difficult to transplant is no good reason for abandoning these finer trees altogether. One large specimen of the silver fir, or the blue spruce, on your lawn is worth all the trouble and

expense in obtaining it. But like most problems, it is not so hard when we know how. Colorado nurserymen are now paying more attention to these noble conifers, and it is often possible to find what you want in some nursery, where they have been acclimated. These should be planted in preference to those from their native habitation. But when they cannot be obtained there, we must go to nature's great nursery to supply our needs, and with due care there should be no failure.

Conifers may be transplanted at any time when there is no frost in the air, except when they are making their first young growth in May or June. Perhaps the best time is during the spring and summer rains. Select small trees in preference to large ones, for they have not such a firm hold upon their location, and adapt themselves more easily to the new places. Trees from open, rather exposed places will succeed better than from shady cañons. Never leave the roots exposed a moment in the sun and air. This is the great secret of transplanting evergreen trees from the mountains. Keep the roots protected. Provide yourself with a piece of matting or sacking or burlap, and after carefully taking up the tree with all the roots uninjured, and with as much earth about them as possible, wrap them well, and carry them at once to the place where they are to be planted. In planting, take the same precaution about exposure to air, digging a large hole, spreading out the roots, and pressing down the soil firmly about them. Shade the trees during the first year, summer and winter, and keep the soil moist and cool about them. The blue spruce especially requires constant moisture until well established.

The two most important factors in successful transplanting are roots well protected while moving, and a moist, cool soil about them when planted. In order to

retain this needed moisture and coolness in the soil as long as possible, it is best to mulch, or cover the soil, for two or three feet above the tree, with coal ashes, hay, straw or dead leaves. When the trees are well established the branches themselves will shade the ground around them, and it will be only necessary to supply them with water, which should be sprinkled over the whole tree as well as on the ground about it.

The end of those branches which are too long should be pinched back, by merely pinching off the end of the new growth as it forms. A tree should never have more than one leader and should this be lost and two or three others start in its place, one of them should be selected and the others pinched back. In this simple way, requiring only a little watchful care from time to time, you will soon have a compact, pyramidal, perfectly formed tree, a charming monument of vegetable beauty, whose grand and lofty qualities will never tire, but be a source of unending delight, "a thing of beauty and a joy forever."

DISCUSSION.

MR. MILLESON: Have forests any influence on moisture?

MR. PARSONS: It is conceded by the majority of educated people that they have a great influence on the holding of the moisture by the soil.

PRESIDENT FAUROT then appointed the committee on Legislation as follows: S. O. OSBORNE, W. B. FELTON, E. T. ENSIGN and ALEXANDER SHAW.

MR. GEORGE PARSONS presented the following resolution and moved its adoption:

Resolved, That whereas the interests of horticultural forestry are closely connected with those of agriculture, the Governor of Colorado is hereby urgently and respect-

fully requested to recognize their interests in his appointments upon the State Board of Agriculture.

The motion being duly seconded was carried.

On motion the Society adjourned until 2 p. m.

January 12, 1889, 2 p. m.

MR. MILLESON in the chair, at the request of PRESIDENT FAUROT.

MISS LERAH STRATTON'S essay on "Floriculture" was read by MISS GRACE PATTON. The essay was as follows:

ESSAY ON FLORICULTURE.

We find that science in any department of knowledge is of intrinsic worth to the human mind, but floriculture is eminently instructive, useful and agreeable. If all the plants of the world were of one shape, size and color, there would result a monotonous uniformity, so burdensome to our imagination as can scarcely be conceived in the presence of the almost infinite variety we now enjoy.

Nature, as if enticing us to search for her hidden treasures, has produced many wonderful forms, so different from each other that our curiosity is awakened when we first observe some unusual product of her handiwork, and, thus stimulated, we are led to look for fresh peculiarities and to push our investigations into innumerable recesses of the vegetable kingdom.

The researches of the botanist have added largely to our list of food plants and have given us a sure guide as to which among the many varieties of the edible plants are best adapted to supply our wants.

Primitive man must have been somewhat of a botanist in a small way, when he first discovered that plants afforded food fit for his use. The first step toward civilization was, therefore, made by each wild tribe, when, with some uncouth dibble or pointed stick, its people planted the first seed in the fruitful earth, and the cultivation of plants, though doubtless long confined to the food varieties only, constituted an important factor in the career of humanity as it progressed toward refinement. Even now, when man has reached the greatest height yet attained, there is no better test of a civilization of the individual or the nation than the degree in which floriculture has become a fine art.

Floriculture has also an advantage over many amateur pursuits in the cheapness and facility with which it can be followed. Every plant may be regarded as an unfolded book, and every flower an attractive object lesson, while unlike mechanics, astronomy or chemistry, it needs no expensive working apparatus.

In treating of this subject, I shall try to discuss it under the following heads, viz: Beauty of Flowers, Fertilization of Plants, and the Influence of Floriculture on the Home.

Many of us have noticed the spirit which seems to be exerted by nature, when we have taken a walk some bright day, and we realize more clearly than ever before what this world of ours would be without flowers. We see them, bright jewels of nature, scattered over the earth; how they make the gray old prairies smile; how they cluster in the sequestered nooks, and how they nestle among the moss on the banks of the streams and are mirrored in the clear water. The mountains are so thickly studded with them that they seem ablaze with splendor. Even the snow does not seem to disturb the

more brave and hardy ones, for we often find them pushing up through its white banks and blossoming there.

● The beauty of our Colorado wild flowers is proverbial; their exquisite shapes, their high coloring, so much more brilliant than in the Eastern States, with their great variety make them noted to the botanist. But even in the different parts of the Centennial State the coloring and varieties are as different as can be imagined. Comparing those of the southern part of the State, with their almost tropical coloring, with their sisters found near perpetual snow, and those in the northern district, and but little resemblance can be found.

The student of nature who is accustomed to general observations, cannot fail to have noticed the different characters of the flowers of spring, summer and autumn, and nowhere is this difference more noticeable than in our own State. Each season, as well as every climate, has a description of vegetation peculiar to itself; for as spring is not destitute of fruits, neither is autumn of flowers, though they have in general but little resemblance to one another.

We find the flowers of spring, delicate, pale in their tints and fragrant in their odors. The summer flowers are more brilliant, larger, and not so highly perfumed as those of spring. Lastly the flowers of autumn appear in unlimited profusion, neither so brilliant as the former, nor so delicate as the latter.

If we are so fortunate as to be near the mountains on a spring morning, and should take a walk, we would, very likely, see appearing on the sunny slope of the foot-hills the beautiful anemonæ, which are among the earliest of the spring flowers. They vary in color from a dark purple and lilac to lighter shades of the same tints. There are found, too, the Solomon's Seal, or, as

they are sometimes called, the Star of Bethlehem, a beautiful snow-white flower of star-like form, lying on its own long, slender green leaves, while near by is generally seen the little Johnny Jump-up, with its numerous bright and expressive faces peeping up from among the grass. As the spring advances toward summer the coloring of the flowers gradually changes, more brilliant colors taking the place of the more sedate shades. The summer flowers are in their greatest splendor in the latter part of June and first weeks of July, and are characterized by their large size and brilliant colors, and combine the two qualities of delicacy and splendor in a greater degree than those of any other season. The prevailing hues of the summer flowers are the different shades of scarlet, crimson and purple, which become paler as the days decrease in length and the temperature becomes cooler.

With August commences a kind of vegetation unlike any that has preceded it. The compound flowers, a very extensive order, begin to be conspicuous, and are a characteristic of autumn. All these increase in beauty and variety, bringing with them the superb asters, golden rods and sunflowers, which, though exceeded in delicacy and brilliancy by the early ones, are unsurpassed in splendor. The prevailing colors of autumn are purple and yellow. Everywhere the fields are covered with asters of every shade, from the deep blue and purple of the New England aster to the purest white. The brilliant golden rod; a multitude of gaudy flowers have usurped the dominions of the roses, hiding the summer shrubbery beneath their tall and spreading herbage. Almost simultaneously with the tinting of the trees comes forth the last beautiful visitant of our fields, the blue fringed gentian. Then comes the first heavy frost, which makes the beautiful flowers droop and hide their

heads ; then the snows of winter come, when everything is hidden except the evergreen, who keeps his perpetual green to remind us that spring will come again after this season of nature's rest.

The colors, forms and fragrance of the leaves and flowers of plants and their fruits, have always been the subject for philosophical speculation, and many theories have been advanced to explain their uses and advantages.

If we observe that a certain plant bears flowers with beautiful forms, hues and odors, we are rational in supposing that these forms, hues and odors are given it for some purpose needful to itself or to its species.

Says one author : "The honey in the nectaries of the flower is a part of that apparatus which, in connection with the corolla and the essences which emanate from the flower, nature has provided for the perpetuation of the species by securing the co-operation of insects in the work of fertilizing the blossom. But the honey in the nectaries of the flower, though placed there to entice bees and other insects, is not designed for the especial good of these insects, but to cause them to perform an act of special benefit to the flower of the plant."

The grasses are an exception to this rule, for nature has formed them in such a manner as to render them independent of the services of insects for promoting their fertilization. She has caused them to spring up in dense masses, and elevated the flowers on long and slender stems, which are easily moved to and fro by the winds and constantly brought into contact with one another. The flowers of the grass, which are without honey, have neither the fragrance of other flowers nor their beautiful corolla, which would only serve to guide the insect to a dry fountain and to an object that has no need of its agency. Nature, therefore, has established other agents to perform this service for the grasses, and has appointed the zephyrs for this purpose.

Says WILSON FLAG : "The hues, the fragrance and the general beauty of the flowers are but parts of an apparatus purposely contrived for the accomplishment of this end—the fertilization of the plant. The honey is placed in the flower for no other purpose but to attract the insect. The fragrance is designed to spread abroad into the atmosphere something that shall notify the insects of the presence of the flower, the beauty of its form and the splendor of its hues are intended to guide the insect to its exact location."

In no place is the influence of flowers and plants more potent than in the home. It is the duty of every one to make the home as attractive as possible, for the associations which spring up around it ; as the scenes of life's holiest emotions are lasting, and we should all do whatever we can to make these associations and remembrances as good, beautiful and loving as possible.

Our home influence is not a passing but an enduring one, and all powerful for good or evil, for peace or strife, for happiness or misery. We should make home attractive by its outward surroundings and inward beauty; we should train the woodbine, honeysuckle and other climbing vines, over the windows and around the portico; plant flowers around the walks—their very perfume will give the home an air of beauty and refinement, and

"Wouldst thou listen to its gentle teaching,
All thy restless yearnings it would still,
Leaf and flower and laden bee are preaching
Thine own sphere, though humble, *first* to fill."

Home is the paradise of human life, and our first object should be to make it as convenient and comfortable as we can ; and our second object should be to render it, to an equal extent, tasteful and elegant, and we can do this in no better way than by having our windows filled with bright and attractive plants, whose foliage and flowers seem to speak to us, and whose

bright expressive faces are turned up to ours as if for approval. When, during the winter, all out-doors is dreary and cold, we often think what would we do without the brightness of the flowers found in the windows of our homes.

We should be careful and give our plants plenty of light, heat and moisture, for the functions of the leaves cannot be healthfully carried on without light; if it be too little the sap is imperfectly elaborated and returns from the leaves to the body in a crude, undigested state. The growth is apt to be coarse, watery and brittle, which is unproductive of either flowers or foliage.

Sudden changes in the temperature where plants are kept is also deleterious to them. Too much and too sudden heat will destroy tender leaves almost as surely as frost. It should also be remembered that the leaves of plants are constantly exhaling moisture during the day. If in too warm an atmosphere, or in one which is too dry, this perspiration becomes excessive and weakens the plant. Different species of plants require different quantities of water, some as the lillies, and flowers of like nature, require a great abundance, but roses, geraniums, etc., the common house plants require the soil to *moist* rather than *wet*.

Another important matter in connection with house plants is the question of their cleanliness. The various insects should be carefully looked after, and not allowed to gather on the stems and leaves, and also the dust that unavoidably settles upon the leaves which chokes up the perspiring pores.

The plants suitable for the house are many and varied. Among them is the beautiful tribe of the oxalis; as a winter flowering plant they are valued highly, and they bloom most profusely, even when the temperature

is not kept sufficiently warm to flower heliotropes. A prettier thing than a basket of these plants can scarcely be imagined, with their delicate blossoms of bright yellow, pink and white, mingled with their bright green leaves.

Another friend, the heliotrope, owing to its agreeable fragrance and cheerful looking flowers is always an especial favorite.

The many colored geraniums with their bright flowers and green leaves also share with their more delicate sisters the praise due them, while the primroses, ivies and cysanthemums and many others too numerous to mention, all have their share in making the home attractive both by their beauty and the cheerfulness which they impart to the rooms.

We recognize, then, beneath the mere outside of this world of nature that is about everywhere, a spirit of its own, something like unto the soul of man. It is no mere hallucination. We bestow upon it the dearest of our emotions. We love it. "'Tis then," says Emerson "the passion remarks the world. It makes all things alive and significant; nature grows conscious. The clouds have faces; the trees of the forest, the waving grass and peeping flowers have grown intelligent, and men almost fear to entrust them with the secret they seem to invite."

The most *truthful* artist, whether painter, sculptor, poet, musician or orator, is he who most accurately interprets nature, whether he be a Michael Angelo, or a Raphael with his almost divine creations; a Phideas, whose conceptions seem to leap into life itself under the touch of his chisel; a Shakespeare, whose word painting of the human soul and its passions have yet to be equalled or surpassed by the human mind, or a Demos-

thenes, whose very voice seemed to possess the power of making men whatever he chose.

In the seasons of the year we see the type of the seasons of the human life. If the days are not all bright and glorious and sunny, we love them the more because they are not so, "for some days *must* be dark and dreary." While the seasons of the year return again and again *we* have but *one spring, one summer, one winter*. Spring will never return to us, but what of that? There is another country where there are no dark days, no equinoxes, no storms, no winter winds—where spring is perpetual.

LERAH STRATTON.

Fort Collins, Colo., Dec. 14, 1888.

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The report of the committee on Nomenclature was called for, and MR. GRIMES said:

We find a large exhibit of apples, and also a great deal of confusion. The duty of this committee should be to correctly name all fruit, and also describe all fruit not of the highest standard—we at last gave up in despair, attempting anything of the kind, and I move that a committee of five be appointed on nomenclature, whose duty it shall be to name the fruits on exhibition, and to classify them, and if any member of this committee is unable to be present at its meeting, the Secretary shall have power to fill the vacancy.

The motion was seconded by DR. SHAW and prevailed.

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MR. S. O. HENRY read the following paper on the "Future of Irrigation:"

THE FUTURE OF IRRIGATION.

BY S. O. HENRY.

Civilization began and first flourished on both hemispheres in rainless countries where irrigation made agriculture certain. How long delayed might have been the dawn of history had the early tribes been obliged to seek more northern countries and wait there until the uncertain rain-fall should create, within narrow boundaries, that superabundant agricultural wealth which their advancement required as a basis! Irrigation was fundamental and universal. It was the palladium of progress. It was woven in tradition and entwined in mythology. Plato speaks of the gigantic irrigating "trenches" of fabled Atlantis. Irrigation, we fancy, supplied the gardens of the Hesperides. The mighty empires of Western Asia were, by its means, reared on most unpromising deserts. Irrigation festooned the hills of Syria with vines, made powerful kingdoms in Mesopotamia, and provided for the millions of Persia. It maintained vast populations in Arabia, Idumaea and Libya. If, in ancient times, a Marco Polo from Chaldaea had traveled over Europe in his interesting search for strange sights, customs and life, he would perhaps have had to recount to his wondering hearers at home a no more astonishing fact than that he had found whole races endeavoring to subsist on only the crops which the uncertain clouds permitted to mature.

To people who have had no occasion to give the subject notice, irrigation seems a system almost as effete as those ancient monarchies of which it was the basis. The fact that irrigation in modern times has only been practiced in the least progressive countries has also tended to connect the system with an out-lived past. But the

truth is that the material foundations of those old nations seem to have been most solid; their agricultural system, based solely on irrigation, was all that any age could ask. Their overthrow was simply due to their inordinate love for luxury, bred of enormous wealth.

In studying the ancient development of Western Asia, we are struck with a great fact which its nations seem thoroughly to have understood, but which modern countries have scarcely noticed. This fact, a simple one, is that a seed, if placed in a glass of water, will grow rapidly and considerably; but, if placed in a glass of the richest soil, it will barely swell. This fact expands into the greater one that arid land is not sterile, because it does not contain soil food for vegetation, but because it lacks water. It has been said that "the spontaneous nature of Europe, of Western Asia, of Libya, neither fed nor clothed the civilized inhabitants of those countries!"—yet irrigation made them the gardens of the world. A modern writer has stated that "too much attention has hitherto been given to the chemical condition of soils, and too little to the physical condition by which moisture and air are supplied to the roots." In other words, modern agriculturalists have disregarded the principle that water acts as the greatest agent in the growth of vegetation. But this principle will become controlling, and will revolutionize all modern farming—it *must* do so. When our country shall be as densely inhabited as Belgium, it must perforce adopt an agricultural system which will enable a man to rear his family on ten acres or less, while under ordinary conditions he would require forty or fifty acres. When Europe shall contain and must support twice her present population, farming by rain-fall must be abandoned, and irrigation must be universally practiced, for under no other agricultural system will "a given amount of intelligent

labor produce so abundant and, at the same time, so varied returns of the good things of material existence."

Realizing the distressing and wide-reaching results of the frequent heavy losses of crops and partial famines of central Europe—results which are nearly always attributable to dry seasons, and seriously affect the military and financial resources of countries—it is safe to predict that irrigation will become generally practiced there before many decades, since it guarantees immunity from drouth. Severe and oft-recurring failures of crops may be shaping the history of Europe more than any prime minister, for they empty the granaries, exhaust the treasuries and sap the courage and progressive spirit of nations. Most fortunate in the race for European supremacy is that country where abundant yields of grain, hay, vegetables and fruits are assured each year by a certain, safe and sufficient water supply.

The increase in the population of Europe is already demanding more irrigation. Few Americans realize its extent and importance there to-day. Fewer are aware of the rapidity with which it is expanding there over large and valuable farming regions, hitherto solely dependant on the natural rain-fall.

An American writer observed several years ago: "There are few things in European husbandry which surprise English or American observers so much as the extent to which irrigation is employed in agriculture." That it is practiced often in localities and under conditions quite foreign to our ideas of its adaptability is evidenced by the fact that on the very borders of the glaciers of Switzerland the meadows are freely irrigated.

In Spain, irrigation is now as universal and essential as it was when the Moors were there, and so carefully preserved the details of the irrigation system that they

kept bronze models of their dams and sluices in their public offices, as guides for repairs and re-building. Irrigating canals are almost as necessary in Italy as in Spain; and the magnificent valley of the Po, which depends on ditches, is perhaps the most fruitful agricultural region in the world.

In France, as well as in Spain and Italy, irrigating canals increase the value of land fully fifty per cent. and the prediction of twenty years ago that the irrigated area of Italy will be doubled, and that of France quadrupled before the end of this century, is being verified. Also, the irrigated territory of Belgium has, latterly, been very largely increased.

In England, as in northern Europe generally, only meadows are supplied with water from canals. An English authority says of Britain, where the precipitation varies from fifteen to one hundred and fifty inches: "It is not very wide of the mark, perhaps, to affirm that English water meadows are doubled in value by irrigation; and a good supply of water has been known to increase the value of arable land from four to ten fold." It may thus be seen at once that irrigation will inevitably be perhaps the greatest factor in the development of America and Europe, and will be wholly indispensable to the fulfillment of their ultimate material destiny.

While pointing out the necessity in the future for irrigation throughout the civilized world, the advantages of a higher nature which it affords may be dwelt upon. Indeed, a student might profitably trace out the connection between the material and, as it were, the spiritual advantages which irrigation offers to the great agricultural class.

It has long been the idea of the larger part of the modern world that, in seeking his highest spiritual pos-

sibilities, man must in a great degree despise prosperity in worldly things. The Anchorites, Hermits, Cynics, Ascetics, Stoics, Quietists—the hundred schools, orders and sects, which embraced in various degrees the ideas of Simeon Stylites on his solitary pillars in the deserts near Antioch; and these succeeded in later times by the Puritans, Calvinists, Jesuits and every one who unselfishly sought to be rich in the spirit—all faithfully shunned worldly gain as the greatest of evils.

But man's craving for wealth, for prosperity, is unconquerable; it will not down; it seems to-day to be gnawing at his vitals more insatiable than ever. Instead of enthusiasts flocking to the deserts and joyfully throwing away all share in the world's best goods, we have modern enthusiasts whose desires are quite the reverse—the socialists, who seek not poverty, but who demand and are determined to obtain their imagined quota of the good things of earth. The petition of our day seems rather to be—Bless the rich in order that they may give! Our modern philosophers, if such there be, hold that spiritual development is not to be separated from material welfare; that prosperity, instead of being inimical to the highest spiritual growth, is meant to be its best aid, and that the great and commendable desideratum of man should be to grow in grace and plenty.

If this be true and right, we may believe without questioning that irrigation as a system will bring, together with the greatest material good, the choicest blessings in all spiritual things to the most important of all classes of men—the farmers. To make this a little clearer, let us for a moment glance at the, we may say, spiritual benefits which irrigation, as compared with rain-fall farming, affords. In farming by rain-fall, not so much value or merit is attached to the intelligence or thrift of the agriculturalist as under irrigation. People

who must depend for the maturity of their crops on an irregular rain-fall cannot make the most of their possibilities. The everlasting uncertainty of the clouds tends to discourage them. They are conscious of an eternal contest with a willful and too often adverse fate. The most ignorant Mennonite will produce grain almost as successfully as his skillful and intelligent American neighbor. Centuries of the most careful tillage, and fortunes spent in the education of the farmer and the improved methods of farming, cannot prevent the frequency of the withering drouth, nor stay the inexorable flood, either of which, in any hour, may ruthlessly destroy what months of labor have sought to create.

But irrigation is a source of faith and courage to the farmer. It puts the drouth in his hands. The fruits of his diligence are commensurate with his ability and experience. He, too, is engaged in an intensive occupation, the revenues of which come as faithfully and regularly as the seasons themselves. Additional means of success are confided to his care, and increased powers are dedicated to his use. Irrigation tends to awake his intelligence and stimulate his energies. The tedious monotony of the seasons as they drag their slow length along, and bring to him, when he depends on the irregular rain-fall alone, his full and certain share of disappointment and failure, is relieved by the variety of interesting subjects which irrigation presents for his successful attention. He must study the application and distribution of water, and its relations to different soils and seeds. As a stockholder, or one otherwise directly interested in the success of an extensive canal corporation, the agricultualist must give thought to all the broad and various co-operative and legal questions which pertain to its management and welfare. It may be difficult to estimate correctly the value of the influ-

ences with which irrigation surrounds, encourages and uplifts the farmer; but nothing is more certain than that it increases the scope of his information, extends the fields of his activities, and enlarges the domain of his usefulness and possibilities.

What strange thoughts flock into one's mind when he reflects that after all the centuries in which civilization has striven onward and upward, giving in its struggles its very life blood as the price for its advancement, we should at this late day begin to realize the necessity for studying and adopting the agricultural system of those ancient empires which long ago crumbled into dust. Irrigation is a mighty bond uniting the very newest with the very oldest—a bond which will draw us so closely in thought and fancy to those forgotten races, who lived and suffered and succumbed to the same problems with which we are grappling, leaving their tremendous energies and deeds but faintly traceable in shapeless piles of sands in Western Asia.

And, moreover, it would seem that the tendency of our times is to leap back into the distant past, and accept the old teachings that prosperity should be the chief end of man. We yet belong perhaps to that great period of the world's history, in which for so many centuries mankind seems to have tried to follow what Seneca expressed so concisely: "The good things which belong to prosperity are to be wished, but the good things that belong to adversity are to be admired." The whole Christian world has shown that man can have fortitude in adversity. The marvelous and momentous history of civilization proves that he can suffer and deny himself and yet successfully live. But a new and more difficult era is upon us. Its motto promises to be that the blessing of the Old Testament is prosperity, and it would appear that we are now face to face with

the very problem which those nations of old so signally failed to solve, and that is, "that the virtue of prosperity is temperance."

President C. L. INGERSOLL'S paper entitled "Experiment Stations, the Relation of, to Horticulture," was then read, as follows :

**EXPERIMENTAL STATIONS, THE RELATION OF, TO
HORTICULTURE.**

In the early times the Greek philosophers and husbandmen were aware of only one certain means of advancement in the art of agriculture. They say, "The art of agriculture can only be improved by observation and experiment." It mattered not that their ways were rude and their methods undeveloped; they recognize the only road to lead them out of this labyrinth into the open road of prosperity—the road of observation and experiment.

Horticulture is one branch of agriculture, so that whatever is presented bearing upon the one will also bear upon the other.

In work in science the study depends on two factors :

First—Whether we can arrange our phenomena.

Second—Whether we must wait for them to occur.

An example in explanation will suffice. If we wish to study the conditions attending a total eclipse of the sun or a transit of Venus, we must wait until these events occur in the regular course of nature, when we must arrange our preliminaries and make the most of our opportunity while it is passing. On the other hand if we wish to study the vitality of a collection of seeds, we can arrange our temperature, soil and moisture to

suit, and repeat our observations and experiment each week in the year.

Unfortunately agriculture and horticulture belong to those parts of science in which we are obliged to labor and wait for results. This is more true of horticulture, as it has to do with plants, shrubs and trees, in part at least, which require years of growth and study in order to determine the results.

It is only in recent years, comparatively speaking, that experiment stations have been established, and only since July 20, 1875, that America could boast of one. This first station was created by an act of the General Assembly of the State of Connecticut. In 1877, the old North State established one, and at the time of this meeting there exist stations located in nearly every State and Territory of the United States; and even Canada and Manitoba each have their stations.

You are all familiar with the Hatch Act and its provisions in which as part of the work named for them, these stations are "to conduct original researches or verify experiments on the physiology of plants, the diseases to which they are severally subject, with remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation of grasses and forage plants, etc., etc."

These bear more directly upon the work of horticulture. In considering this subject it would be well for us, perhaps, to look to the several departments of horticulture. For our purpose we will name :

1. *Flowers (including ornamental shrubs and trees).*
2. *Vegetables and small fruits.*
3. *Orchard Fruits.*
4. *Forestry.*

This classification is by no means complete or exhaustive, and others, perhaps better, might be made.

1. *Flowers and Ornamental Shrubs and Trees*—We apprehend that outside the cities where flowers are more used and more highly appreciated for any and every occasion, there are many people who would consider experiments with flowering plants as time and money worse than thrown away. For ourself, we would consider that some of those indefatigable workers and investigators who have given to us some of the most beautiful roses and tulips are deserving of great praise and the thanks of future generations. The grounds of the State Agricultural College show to the visitor some of this work, in the development of flowers, trees, etc. Private enterprise has moved in many places but much more should be done.

2. *Vegetables and Small Fruits*—In the line of vegetables and small fruits the State Experiment Station should be the place whence liberal distributions of seeds and plants proved true to name should go forth to the people. It should be a place where new varieties are propagated and seedlings of many kinds and varieties tested. This is work that the individual cannot afford to do for himself, but should rather delegate it to the State and receive from her such things as have stood the test.

3. *Orchard Fruits*—With the well-known proclivities for smooth-tongued oratory which had no close relation with truth, many to-day gnash their teeth and register a vow against all men who deal in fruit trees.

The Experiment Station was not designed to take the place of the nursery-man, but to oversee, to some extent, their work, and, in part at least, to test and send out new and untried varieties, as root-grafts and small trees, after they have been thoroughly tested and proved.

4. *Forestry*—Many people are skeptical in regard to forest tree growth in the arid region. I believe we are but at the threshold of an era of forest tree planting and growth, which cannot fail to be of benefit to this whole region. There are numberless questions already asked, and hundreds more are in the background waiting to be pushed forward into notice at the first available opportunity.

What to plant? How to plant? What protection, if any? How prepare the soil? How give after culture and treatment? What varieties do best? What will grow at all? What is the present climate? Will this be changed by tree culture? etc., etc. These are all questions on which we have but little light at present. Each experiment station should do something with forestry. There should be definite areas planted out to single sorts, and an arboretum, in which a few specimens of all varieties which can be induced to grow should be planted, thus illustrating the comparative growth of the many sorts under the same treatment.

These are a few suggestions and hints as to how an Experiment Station may fulfill the conditions of the Hatch Act and aid horticulture.

A few words as to the experimenter and I will close:

First—He should be disinterested. The man with a theory and an explanation for everything should be avoided, as well as the man who has no theory, and is never able justly to interpret his results when they are obtained. He must stand aloof from every seedsman

and nurseryman and yet work with all; anything they may say or do should have no bearing on his results or their interpretation. He should do his duty to the State faithfully and fearlessly. He should never attempt an experiment in the light of any preconceived notion, but ever be able to hold his judgment subservient and in abeyance until the returns are all in, and the weight and bearing of each part determined. There must be no jumping at conclusions.

Second. He must be a man of integrity. There must be no fixing up of results, because it has taken so long to complete the work. There must be an absolute statement of facts; to this the people are entitled, and from these they may be able to draw their own conclusions, which may be of great value to them.

Third—Again, he must be a keen observer of nature and the workings of her laws. The ancients knew many things by experience (observation), but the keener observation of later investigation has shown us the large element of error in their observations.

Observations are of three classes :

1. *Mal-observations (poor or bad.)*
2. *Non-observation.*
3. *Good observation.*

In the former case one fails to see the cause of certain effects though it may be in plain sight, but sees something else, which is immediately seized upon and called the true cause.

An illustration is that of a wonderful sympathetic powder to cure wounds, which, if bound on the sword or other instrument causing the wound, would cause it to heal rapidly. In the meantime, the wound was to be carefully washed and dressed and rest enjoined for

several days. These sanitary precautions on the part of the patient being duly observed the wounds often healed by "first intention;" but the powder on the sword received the credit through poor powers of observation.

In the case of non-observation one may only leave out *one* important circumstance in an experiment, yet that one may be of the utmost importance in order to complete the chain of evidence necessary to a scientific conclusion.

Fourth—And lastly, the experimenter should be one who has had careful training in the things which have a direct bearing on the work in hand. He should understand thoroughly in regard to nature's processes ere he seek to subvert or change them in any way with hope of ultimate success.

There are other minor qualifications, but as these are of such a nature that all easily recognize them, it will be unnecessary for me to extend the list.

In conclusion let me say that we are entering upon a most important era, in which there promises to be far more material progress in horticulture in the few years remaining to this century than in all those preceding.

To this end, let this society lend its labors as it has nobly done in the past, and heartily join hands with the College and Experiment Station for the benefit of horticulture.

Through the faith in the hearts of a few noble men and women in pioneer days, we to-day revel in the enjoyment of Colorado grown fruit, and the day is not far distant when much more will be done than the most sanguine dream.

May we then, with all lovers of flowers, fruits and trees, labor for this millenium of horticulture in the days that are to come.

C. L. INGERSOLL.

December 25, 1888.

The next paper on the programme was a paper by MR. STEELE. MR. STEELE not being present to read his paper, on motion of DR. SHAW it was ordered placed on file for publication. The paper was as follows:

FRUIT CULTURE IN THE GRAND VALLEY.

BY C. W. STEELE.

While fruit culture in Grand Valley is yet in the experimental stage, we have learned enough to know that few if any sections of the United States offer greater advantages to the orchardist and fruit grower for a successful and profitable business.

The industry is too new for us to determine as yet the varieties best adapted to the soil and climate of Grand Valley. We find the experience of horticulturists elsewhere in the State of but little advantage to us, and even in localities but a mile apart we find a great difference in results with the same treatment. On one or two farms we find the last hard winter to have killed peach trees, while orchards a mile or so distant perfected a fair crop of fruit. Last winter at Hopedale, which is a bottom farm, some fifty seedling peach trees, valley grown, transplanted the spring previous, were killed, while the budded varieties were but slightly injured and this winter are full of fruit buds in perfectly healthy condition. Peaches on the higher lands back of the river were uninjured, many of the trees perfecting a fine crop of fruit. I charge the injury to many trees princi-

pally to too much irrigation and late cultivation. ' The probabilities now are that Grand Junction will have thousands of bushels of peaches next season for shipment.

We have planted some twenty-five varieties of apples, of which we utterly condemn but one, the Maiden's Blush. It seems to have run out, a part of the trees killed down two winters in succession. Others bloomed twice, in spring and summer, matured a few imperfect specimens, not one thrifty or vigorous tree in the lot.

We have had the best satisfaction from planting trees one year old. Of 100 one-year-old trees planted spring of 1886, a number bore fruit last season, two years after planting; one, a Missouri Pippin, ripening twenty-nine perfect apples of medium size. Some trees of the Rome Beauty and Ben Davis also fruited at three years of age. All have made a vigorous growth.

Pear trees grow rapidly, but none have fruited as yet. Sweet cherries, as well as the sour varieties, have proven perfectly hardy. Of plums the Gages have made the most rapid growth. American varieties have borne most abundantly where planted close together, but where planted alone have borne sparingly, or not at all.

The apricot and hardshell almond have proven more hardy than the peach, and trees of sufficient age have borne every year. The Russian Apricot is our ideal of a hardy tree for the Valley, but I am not able to speak of the quality of its fruit. It has not come into bearing as early as the American varieties.

The first year after planting my quince bushes killed to the ground, but were not injured in the least the last two winters.

Walnut trees make a splendid growth, and, contrary to my preconceived opinion, are easier transplanted than an apple tree.

Gooseberries do well. The Houghton is mostly planted, but two plants sent me in 1884 by MR. DEVINEY, called by him the Noble English, excels any other I ever saw for size, abundant yield, and strong upright habit of growth.

The mild winter of 1886-7 all my red-raspberries, Turner, Cuthbert and Crimson Beauties were killed to the ground, the severe winter of 1887-8 injured the Cuthbert and Crimson Beauties but the Turner bore a full crop. The Black Caps, Gregg, Davidson and Mammoth Cluster have never failed, have given no winter protection. The past extremely cold winter did not injure any of the hardy varieties of grapes, but Chasselas, Massasoit and other tender varieties left uncovered were killed to the ground. The winter previous did not injure any variety grown. California varieties are being largely planted and have produced most abundantly. Of strawberries, the only fruit that has been grown in quantities for shipment, their reputation has been already established, and for size and flavor can be nowhere excelled.

To our friends elsewhere in Colorado who have tried to grow grapes and failed, we would say, try the Clinton, we know localities east of the mountains where it is the only grape that can be successfully grown.

As yet those pests of the orchard, the curculio and codlin moth, are unknown; we have never seen an apple that was grown in Mesa County that was wormy.

To sum up, Grand Valley has many orchards of a few trees to eighty acres in extent. Each spring and fall the area is constantly widening. Apples prove successful

everywhere; peaches reliable on the high Mesas, with rarely a failure from late frosts; on low, moist lands the buds are liable to winter kill; apricots, plums and almonds are more reliable in all situations. Grapes mostly hardy, but the tender native and California varieties need protection to stand an exceptional severe winter. Raspberries, black caps, profitable; red not proven so as yet. Blackberries hardly a success; to be successful here, as elsewhere, requires close attention, the orchardist must love the tree as well as the fruit. We are each year more fully convinced that every condition for successful fruit growing is here to be found; it but yet remains to discover the best varieties, and we might add the Ben Davis apple has proven almost as much superior to the same apple grown in Missouri, as the Maiden's Blush has proven inferior.

We have planted trees both spring and fall, and cannot say we have any real preference. We commenced our late planting the middle of November, and continued until December 12th, when the ground began to freeze. Have found no difference as to hardiness or reliability of growth between trees grown here and those sent us from Missouri, and we would say here at the risk of being tedious, never buy a tree from a peddler. Nurserymen are generally honest, and money can be saved and trees obtained true to name, by sending to the grower direct.

Our first planting was purchased from an agent of a New York nursery. Not one article proved true to name. The Fay currants proved white, the Niagara grape black, the Industry a very small Houghton, and so on. This, notwithstanding two or three times as much was paid for them as we could have obtained the genuine for by ordering direct from the nursery. Thousands of dollars have been squandered by buying inferior varieties or those untrue to name; Iron clad varieties,

whole root process, or some new *fad* always at hand to help the sleek-tongued peddler to gull the hard-working farmer into paying three or four prices for something, he may know what, when it fruits, if it ever does.

Each fruit-growing county should support a Horticultural Society. Much practical benefit can be learned from the failures and successes of our neighbors, and thus can be more speedily learned the mode of cultivation and varieties adapted to any one locality, and advance the fruit-growing interests of Colorado.

DR. SHAW moved that all unfinished business be left to the Executive Committee for action. The motion was seconded and carried.

MR. PRATT: There are several papers which have been read, which ought to be read by all. What is the system of publication of the Society?

DR. SHAW: The report of the Society is published every two years.

MR. PRATT moved that the Secretary be authorized to take such steps as in his judgment are most economical, for the purpose of securing prompt publication of such papers as are of interest to fruit growers. The motion was seconded by MR. GRIMES and carried.

DENVER, Jan. 29, 1889.

Executive Committee met on call for purpose of auditing bills, etc. Present, LEVI BOOTH, DAVID BROTHERS and ALEX. SHAW. LEVI BOOTH in the chair.

The Secretary's statement of receipts and disbursements of funds as stated in Annual Report, 1888, was approved. The following bills were audited and

allowed, and Secretary was ordered to pay them from funds in his hands arising from annual membership fees:

| | |
|--|---------|
| Miss Grace Patton, for reporting proceedings of Annual Meeting, 1889. | \$25 35 |
| Mr. Tuffman, expressing | 2 00 |
| Rocky Mountain News Publishing Co. for Letter Heads and Envelopes | 5 75 |
| Chain, Hardey & Co., Stationery | 90 |

Adjourned.

ALEX. SHAW,
Secretary.

DENVER, April 8, 1889.

Executive Committee met on written notice by Secretary. President C. S. Faurot in the chair. Present, C. S. FAUROT, DAVID BROTHERS, JOHN TOBIAS and A. SHAW. Minutes of last meeting read and approved.

The treasurer having received the special appropriation of \$1,000.00 by the State Legislature for the relief of the Association, the following bills were audited and allowed, and the secretary was ordered to draw warrants on the treasurer for the respective amounts:

| | |
|---|-----------|
| J. M. Clark, Association's note given him for services as Secretary, \$150.00; interest on same, \$35.70; total | \$ 185 70 |
| Nelson Millet, for services as Secretary two years, 1886-7 | 300 00 |
| Alex. Shaw, for services as Secretary year 1888. | 400 00 |
| C. S. Faurot, for cash advanced by him for printing letter heads | 5 00 |

On motion a summer exhibition by the Association was ordered to be held at Boulder, time to be definitely fixed by Executive Committee at a subsequent meeting.

Adjourned to meet Monday, 15th inst., at 10 a. m.

ALEX. SHAW,
Secretary.

DENVER, April 10, 1889.

Executive Committee met pursuant to adjournment. Present, C. S. FAUROT, DAVID BROTHERS, JOHN TOBIAS, WM. DAVIS and ALEX. SHAW.

On motion of DAVID BROTHERS, it was ordered that the sum of \$2.50 per day and traveling expenses, also hotel bill not to exceed \$2.50 per day, be paid to each member of the Executive Committee for every day spent in attendance upon called or regular meetings of said committee.

On motion the following persons were appointed on standing committees for the year 1889:

Botany and Entomology—PROF. JAMES CASSIDY, Fort Collins.

Ornamental Gardening—JOHN BERRY, Denver.

Vegetable Culture—W. W. WILMORE, Denver; W. L. PORTER, Greeley; J. S. IBBISON, Denver.

Pomology—JAMES ACKERMAN, Hygiene; DALL DEWESE, Cañon City; HON. SAMUEL WADE, Paonia.

Forestry—COL. EDGAR T. ENSIGN, Colorado Springs; D. S. GRIMES, Denver.

Geology—PROF. LAKE, Golden.

Irrigation—PROF. CARPENTER, Fort Collins; ELWOOD EASLEY, Golden.

Ornithology—A. F. ALLEN, Denver.

The Secretary was directed to perfect the list of Vice-Presidents for the several counties in the State.

On motion, the President and Secretary were constituted a committee to appoint time, arrange programme and premium list for Summer Exhibition of Horticultural Products at Boulder. The sum of \$100.00 is hereby appropriated to pay premiums at said exhibition; the committee name June 19 and 20, 1889, as the day to hold said exhibition.

On motion of JOHN TOBIAS, it was ordered that a warrant of \$25.00 be drawn on Treasurer for incidental expenses of Secretary's office.

Adjourned to meet on notice of Secretary.

ALEX. SHAW, *Secretary*.

REPORT OF THE SECRETARY OF THE COLORADO STATE
BEE-KEEPERS' ASSOCIATION FOR 1888.

The annual meeting of the State Bee-Keepers' Association was held at Denver, on January 16, 1889.

The report of the Treasurer showed the Association to be in a sound condition financially.

The report of the Secretary showed that the past year had been one of great advancement in the development of this industry. This is attributable to the diffusion of a knowledge of the better methods of preparing honey for the market and also the establishing of a ready market at good prices. Bee-keepers are discovering that *it pays* to give the little workers proper attention and proper facilities for storing the results of their labor.

The Secretary has collected statistics showing the product, etc., for 1888. While not claiming absolute accuracy in these reports, they are much more accurate than such statistics generally are. The figures given below are those actually reported by bee-keepers. While a large number have not reported at all, all the larger apiarists have sent in their reports, hence the table below comprises the bulk of the crop. Basing estimates on the number of stands of bees reported and the number not yet heard from it is evident that the total honey product of the State was considerably in excess of 200,000 lbs.

The following table shows the product by counties:

PROCEEDINGS OF THE STATE

| COUNTIES. | No. of Bee Keepers who reported. | No. of Hives on hand last Spring. | Increase. | On hand Dec. 1. | No. lbs. Comb Honey. | No. lbs. Extracted Honey. | Total. | Percent of Increase in swarms. | Average lbs. per Hive. |
|----------------------|---|--|-----------|--------------------|----------------------------|---------------------------------|---------|--------------------------------------|------------------------------|
| Arapahoe | 51 | 873 | 317 | 1,171 | 43,973 | 2,090 | 46,063 | 34 | 52.75 |
| Jefferson | 20 | 497 | 125 | 582 | 24,398 | 8,208 | 32,606 | 15 | 65.60 |
| Weld | 23 | 639 | 135 | 745 | 17,577 | 8,550 | 26,127 | 16½ | 40.88 |
| Boulder | 30 | 443 | 188 | 597 | 18,395 | 3,500 | 21,895 | 35 | 49.42 |
| Larimer | 20 | 317 | 192 | 486 | 9,746 | 4,290 | 14,036 | 53 | 44.27 |
| Delta | 22 | 57 | 139 | 154 | 6,136 | 0 | 6,136 | 170 | 107.65 |
| Montrose | 7 | 24 | 35 | 59 | 3,995 | 0 | 3,995 | 146 | 166.00 |
| Fremont | 5 | 68 | 16 | 81 | 2,125 | 0 | 2,125 | 19 | 31.25 |
| El Paso | 3 | 35 | 10 | 45 | 1,366 | 0 | 1,366 | 28 | 39.00 |
| Bent | 2 | 9 | 7 | 16 | 100 | 275 | 375 | 77 | 42.64 |
| Huerfano | 2 | 15 | 17 | 23 | 150 | 0 | 150 | 113 | 10.00 |
| Mesa | 1 | 2 | 8 | 8 | 100 | 0 | 100 | 400 | 50.00 |
| Las Animas | 1 | 2 | 0 | 2 | 80 | 0 | 80 | 0 | 40.00 |
| Douglas | 1 | 18 | 5 | 23 | 60 | 0 | 60 | 28 | 3.00 |
| | 188 | 2,999 | 1,194 | 3,992 | 128,201 | 26,913 | 155,114 | 81 | 54.73 |

There are about 400 bee-keepers in the State, only 188 of whom have reported.

For several years, to a limited extent, the disease known as foul-brood, or more properly *bacillus alvei*, has existed in the vicinity of Denver. During the past two or three years, however, it appears to have made sad havoc in a few apiaries and to have spread to many others. Thus far no cases have been reported except in the counties of Arapahoe and Jefferson.

The Association took the matter up and succeeded in securing the enactment of a law whereby those who through carelessness or indifference fail to take the proper measures to protect themselves and their neighbors may be compelled to either cure or destroy the disease whenever they discover that they have it in their apiaries. It is believed that a proper enforcement of this law will prevent the further spread and secure the ultimate eradication of the disease.

This industry, while comparatively of small importance at the present time, is yet evidently destined to assume rank as one of the valuable productive industries of the State. Bee-keepers have every reason for encouragement now to devote to the business the time, energy and capital necessary to the full development of the industry. With a climate peculiarly favorable to a long honey season, with thousand of acres of alfalfa and other honey producing plants, with a law to protect against the spread of contagious diseases, and with an established market for all their honey, it would seem that the conditions are all favorable to a large increase in the production of honey.

Yet it must not be thought from the above that any one can locate *anywhere* in the State and make a success of bee-keeping. Some localities are far more favorable than others and the field should be well looked over

before locating. Counties, which in the report accompanying this, show a very small amount of honey produced, may yet be found to be fine honey producing localities. Like many other industries of the State, it is still in its infancy.

Respectfully submitted,

J. M. CLARK,
Secretary.

Treasurer made the following report:

| | |
|--|----------|
| Cash on hand December 13, 1887 | \$ 11.75 |
| Receipts | none. |
| Total | \$ 11.75 |

A paper on "Village Improvement" was read by MRS. ALBINA WASHBURN, as follows:

VILLAGE IMPROVEMENT.

Another year has slipped by and we come again to the mile-post whose flowery label reads: "Annual Meeting of the Northern Colorado Horticultural Society."

Our good Secretary has dealt out to the suffering few various titles for "essays" or "attempts" to edify, instruct or amuse the patient many, and thus carry on the theoretical, historical and social work whose practical application, in our widely separated homes, slowly builds toward perfection, or ideal form, the wondrous beauties and utilities of plant and vine and tree.

Thus to me falls the topic "Village Improvement." Now, being Western born and bred and therefore unfamiliar with "villages" as they are known in New England, I must beg leave to "magnify my office," and give a few thoughts at random on some possible correc-

tions in the management of communities whose members for mutual benefit, pleasure and safety, unite in the use of certain regulations known as municipal government.

West of Omaha, these communities, either actual or speculative and imaginary, are all "towns;" from the solitary buffalo skull at the roadside, among the lonely sand-hills of that ancient myth, the Great American Desert, where "John Smith, of Smithland, Smithland county, Iowa," has registered his distinguished autograph, to the "large and flourishing settlement" (on paper) whose "natural conveniences and lucrative resources have been so long overlooked" (see circular) "by the landless and the homeless;" and on, even to Denver—"Queen City of the Plains"—who with but one brick building and a collection of mud-roofed cabins with oiled-paper windows and Navajo blanket doors, away back there in the '60's proudly adopted the name of "Denver City," and as it grew and grew, more proudly yet dropped the "City" in disdain; being now really a "town," to become a city was, of course, a foregone destiny which to mention were to doubt.

Ah, well! The march of civilization, as we like to call it, has built beside the lone buffalo head a railroad town; has materialized from the busy schemers "plat" a thriving county seat; and Denver, with its overflowing business marts, its public buildings of native stone, its elegant residences and magnificent lawns, has become a great railroad center; haughty indeed as *any* "queen," but not yet large enough or rich enough to have parted with her greediness and her jealousy of rivals, no matter how insignificant they may be. Her primitive days of waste tin cans, which, filled with goods had crossed the plains in ox-trains; of Mexican beans and blue meal laboriously brought in on the burro-trains of New Mexico; and of profane gold-seekers, gritty flour and monte gam-

blers were generous with a common blood—a unity against their common foe—the Indians. No revenues from the unfortunate built up a stilted aristocracy in those days, as now; but, let us hope that when the full tide of her vain adolescence has gone by, she will return to those simpler village improvements for her humblest citizens, which mean morals and manners as well as visible order and beauty.

Western towns plainly indicate to the observer the haste and lack of method which accompanies their growth. To this, we may remark, the colony towns of Greeley and Longmont, and probably a few others, form exceptions. Colonies are communities transplanted, with their governing powers already systematized, or made soon after the settlement of the whole body, and have a decided advantage over that desultory “gathering of the clans” from all points of the compass without forethought or plan, or even knowledge of what they will meet on arrival, and receiving constant accessions of others as unprepared and unorganized individuals as themselves. No wonder we make blunders, and years pass before we can really begin to live like educated, benevolent, harmonious beings.

True, having plenty of land, our streets are tolerably wide and straight. We were not obliged to follow the cow-paths in their tortuous windings along the river, as those early-rising people of Boston did (though we may have once paid some respect to buffalo trails), or to huddle fearfully together within whispering distance of one another, as in the cobble-paved streets of old Philadelphia; but we have made many other mistakes (if such we may call them), the outgrowth, as well, of peculiar local circumstances and necessity.

Our streets, if wide, are also weedy, except in the busiest centers. The fatted calf is occasionally seen

meandering along, unattended, to meet the "Probable Son," as Mrs. Partington has it; while the melancholy cow sometimes misses her way to the "pound," while the town marshal is engaged in a friendly game of "poker" with his "ante." The well-worn hitching-post, weary of servility, anon starts down the street with a lively team who take umbrage at the last year's circus poster, as, toying with the breeze, it waltzes dizzily down the walk. The refuse heaps in some of the backyards are still uncivilized, and the vestful park with its sylvan shades, its broad drives and winding walks, its tiny grottoes and tinkling fountains is yet in the dim and perhaps distant future. We clean the main street once or twice a year for the running of the "hose-team;" as for the balance of the year, were it not for the beneficent Colorado zephyrs who sometimes sweep down and through with their life-restoring, miasma-destroying airs—well, the undertaker would have the finest house in town. Improvement is sadly needed in the uninviting suburbs. Along the railroads as we pass through, too frequently the word "saloon" greets the eye; and announcements of its kindred "Beer Hall," "Sample Room" and "Drug Store" indicate the supply and demand of those who, alas! "know not (or care not) what they do."

As the swarthy engineer returns to his place, and we move on slowly, we have time to note the unclean surroundings, the untidy children clinging to their still more untidy mothers, who, apparently all unconscious of invidious gaze, stare, babe in arms, after the moving train. Do they realize themselves to be the degraded, ill used supplement to the signs overhead and about them? Or understand that the hearts of passing strangers sometimes ache for them and the little ones.

The *commercial idea*, instead of "love," now "rules the court, the camp, the grove."

We establish the dram-shops, we build the calaboose and then the opera house. How many will the opera house seat and how much per head per night?

What can we "*make*" on goods "laid down" here? How can we manage to "stand in" with the railroads and get "rebates"? "How much interest can we get on money, and what shall we do with the farms after we foreclose on them?"

Out barely beyond the "limits" we look down unwillingly on heaps of refuse, the dumping grounds of the town, where coal slack, ashes, tin cans, disabled kettles and broken crockery vie with rusty stove-pipe (lame in the joints and out at elbows), denuded bones and pasteboard boxes to frighten fractious teams and incidentally furnish more "shocking casualties" for the local newspaper.

But for true grit and enterprise in certain lines commend us to Western towns; for, the things that follow close on the heels of the saloon, calaboose and opera house, are water-works, artesian baths, electric lights, street cars, a brass band, a star troupe and the hose boys. Among the women (for here women lead), we have after the itinerant Methodist preacher, the church, the Sunday-school, the school-house, the library, the various organizations of the grange, the W. C. T. U., the Relief Corps, missions, the "Literary" and the King's Daughters—not to mention sewing circles and occasional home concerts, election dinners, church suppers and grange festivals. Alas! there is little time for artistic, horticultural or even economical improvement!

And yet, there is need of it and of the leisure for it. There is *more need of pleasant homes than of churches*,

schools or opera houses; for they are but supplementary to the true home. A comfortable and convenient house, fitted with all the latest devices for reducing housework to its simplest terms (including an abundance of pure water); a sunny porch for winter; a shady tree for summer; a neat and well-kept lawn, be it ever so small; smooth, hard paths, always dry; a neat vegetable garden in the rear, containing also a few fruit trees, bushes and vines; borders and corners and plats for flowers and climbing vines, where the children (God bless them!) may learn horticulture from Dame Nature herself—the first great kindergartner—these should be within the reach of every family. Let none who have health and strength plead poverty; to such, *poverty is a crime.* To those who *will* a home comes, and the *development of the soul* begins when we *dress and keep a garden.* It is related of the French soldiers that they used to plant lettuce, radishes and other simple and easily grown plants under their bunks in their winter quarters, and when ordered to the front, they regretted not so much going to meet the enemy and the issues of life or death as leaving their beloved little gardens, whose fresh leaves and succulent roots were to ward off the terrible scurvy and give variety to a soldier's monotonous fare.

Public parks should be instituted, and reserved in young and growing towns before they become too compact or the land too valuable. Parks are needed for breathing places, for social walks and chats, for open-air concerts, lectures and other means of making people happy and wise. "God made the country, man made the town." Happy the community which recognizes the wisdom of reserving and beautifying remnants of the country in the midst of the town. They should contain *native* flowers and shrubs and trees and lakes and "verdant banks" arranged so artistically, yet nat-

urally, that citizens may take pattern after them in their private grounds. Our premises should be clean, neat and attractive. Put something, if it be but a single flower or picture or quaint design, in the window; or a plant or floral device in the door-yard to cheer the passer-by and remind him that "God is good." A little red wheelbarrow, filled with flowers and drooping vines growing thriftily, was seen on a tiny lawn; the effect was charming. On another lawn rode a full-rigged diminutive ship sailing "into the West," laden with Flora's treasures. I should like to see adjoining neighbors' front yards divided only by sweet-pea or wild-rose hedges. So many dividing fences are not only expensive and inartistic, but seem to indicate that cold formality between man and man which ignores a common brotherhood and that sweet sympathy which rates the good of each as the vital concern of all.

Plant also along the roads and streets hardy fruits and a variety of shade trees of beauty as well as utility. But then, any tree, in congenial soil and harmonious surroundings and in a thrifty condition, is beautiful—so one cannot go amiss if these things be given. Why not line Locust street with the different varieties of locust trees? Why not define Elm street by drooping elms? Willow street by graceful willows? And use the serviceable walnut for Walnut street, the cherry for Cherry street, and so on. Such a plan would furnish good object lessons for the young and a simple guide to strangers.

At prominent corners in tiny parks set aside for the purpose, on avenues named for public men, we might erect their statues (*not effigies*) in handsome bronze, granite or marble.

A competent board of "city fathers" (and *mothers*, if you please) should enact ordinances to keep the streets clean; also vacant lots and out-of-the-way places. Drink-

ing fountains for persons and animals should be frequent, well paved around them, and made as artistic as possible.

Ashes should be utilized for making paths and walks and *never* thrown into the street.

Coal ashes make excellent walks when mixed with an equal quantity of coal dust and wet down so as to become solid.

The walks should be slightly rounded up in the middle to shed water readily.

Ashes are said to be good also to lighten up heavy clay soils, and in certain cases for mulching. The surplus of ashes, coal dust and manure of towns, villages or cities ought to be systematically disposed of to surrounding farmers so as to subserve the utmost possible use; for "economy is wealth." The frequent and regular removal of kitchen waste should not be left to chance or the whim of persons perhaps ignorant or careless of sanitary requirements, but should be provided for by ordinances strictly enforced. There is often great waste of food in private families as well as hotels. A woman was heard not long since remarking to a neighbor that they never bought anything for their pig, as her husband, who worked about town at various jobs by the day, had the waste from several kitchens given him for it. The pig had grown to be a hog of several hundred pounds weight, and would soon go into the pork barrel for winter meat.

"And you ought to see the waste of some people," said she, "whole loaves of bread and great pieces of cake and pie and meat—enough to feed two or three families well, if saved."

A wise system of public economy must avert, as far as possible, the consequences of such private extrava-

gance, until domestic economy shall be taught in free schools, and practiced as a serious moral and sanitary necessity.

The advertising nuisance has become a national calamity. Some one has said that travelers from foreign lands must take us for a nation of invalids, judging from the number of patent medicines placarded conspicuously over the whole country.

From shore to shore, and from Manitoba to the Gulf (and for aught I know on the snow banks up North and on the turtles' backs down South), through towns and along country roads, the patent medicine man (and he has numerous cousins in every community) perambulates unblushingly, paint brush and stencil in hand, at the bidding of an employer, so lacking in good sense, feeling and modesty that neither birth nor naturalization could ever make him a citizen of any country but ours, if he live to Methuselah's age.

In the Centennial year, while approaching New York city, as the train moved slowly across a bridge, my husband remarked as he glanced through the window, "the Delaware river!" I looked out quickly while visions of revolutionary struggles rose before my mind. Here had Washington, valiant and undaunted, crossed with his faithful troops amid the floating ice in the bitter winter weather; Valley Forge privations and bleeding feet with aching, fearful hearts—all these had gone before the victory—all these had made this Centennial exhibit of all nations possible! Thus history almost instantaneously photographed her pictures on my mind as my glance rested on the river. The level rays of the setting sun gilded the broad Delaware and lit up a noble barge riding at ease upon the waves, perhaps an eighth of a mile away. The boat was brilliantly white, and across its broad stern was painted in immense black

letters—what do you think? “The Jolly Tar?” “The Mary Jane?” “The Delaware Belle?” “The Rose of Sharon?” No! Imagine the mental shock and reaction which followed the involuntary reading of these words: “Use Gargling Oil.” “Never!” I thought, indignantly turning away, “*never*, while I live!”

As we trundled over the bridge at Schenectady I looked down at the wharf lights twinkling in the dark waters beneath us, and by their light saw on the broad span of the bridge: “Use somebody’s Smoking Tobacco!” Hardly dare I glance at the moss-grown roofs as we sped across New York and Pennsylvania—scarcely dare let my eyes rest on the magnificent viaducts, the solid masonry of the tunnels of the Alleghanies, the well built farm houses, or the cunning little rustic stone depots, lest this hydra-headed monster of sordid and unprincipled voracity spring at my now morbid sensibilities and destroy my peace. And “out West” it is no better. Even here in this land of clear skies and pure air and unlimited possibilities for God’s children, we have merchants so lost to every sense of honor and good taste as to thus abuse good nature and transcend their privileges. I say the man who brands his neighbor’s fence before his dwelling with unsolicited information about his own private business, and inducements, whatever they may be, is “fit for treason, stratagems and spoils,” and that rather than patronize such a man I will order my groceries from Chicago or St. Louis of the first drummer who comes along.

And, farther, rather than to obey this presumptuous dictum which says, “Go here,” or “go there,” “do this,” or “do that,” and immediately provide myself with somebody’s “cough cure,” I will let consumption, “like a worm i’ th’ bud, feed on my damask cheek,” and will let my ghostly cough go “thundering down

the ages" and reverberate against the walls of time, and will *never* countenance or encourage this thing *without a sign of an excuse for its existence*. Let public sentiment give us speedy relief and declare that liquors and tobacco especially, acknowledged evils to society, can not be thus publicly and shamelessly recommended to the youth of our country with the tacit sanction of public opinion and the law. A few years since our mountain scenery was being overrun by these vandals, when some one (no doubt a woman) called a halt by directing the attention of the Legislature to the fact, and a law was passed prohibiting the defacing of "natural scenery." We want this followed up with a penalty for advertising one's business at all off of one's own premises, except in certain stipulated places; that business signs shall not exceed a certain size, nor become obtrusive to the public. The ever-striving selfishness and rivalry is at the bottom of it all. The X brand, however superior, must be outdone by the XX brand, however inferior, and the XX in turn by the three-X and the four-X, disgusting all disinterested, thoughtful people with the rapacity of men in trade.

But, after all, we mean well. We are *only* enveloped in the *most dense ignorance* of the true elements of success, and the every day application of the golden rule.

Let us cultivate "friendship in trade," for if there is none there ought to be. "In honor preferring one another." Let us go into partnership with dear old Mother Earth and the sky-born rills, and plant trees, vines, fruits and flowers. Let us improve, and evolve ever a better and better future for ourselves and others by retaining the best of the old, dropping without regret the unworthy in horticulture and in our own natures and making experiments intelligently, reach forward to "prove all things," and "hold fast that which is good."

Let us straighten and grade and beautify our roads out of town and keep them in repair for the poor patient horses and their equally patient owners who bring to us wheat, corn, potatoes, fruit, lumber, wood, posts, poles, coal, game, rocks and evergreen trees; and for the sake of the brave women who drive daily along the monotonous and dusty highway to bring us their butter, eggs, cream, honey, poultry, meat and fruit, and not seldom the heavier products of hill and valley, supposed to be handled only by men. They come to trade, and carry home dry goods, groceries, hay, grain and flour and even water to drink. These women pay taxes, though unrepresented. Every day's work done on the road, every bridge built, every gallon of pure water brought from the mountains, every lamp lighted, yea, every saloon licensed to ruin their boys or others dear to them, is paid for in part by women. Paid unwillingly, it is true, (since the knowledge of such injustice has permeated the humblest household in the land), but exacted *lawfully* and paid peaceably.

These women who have no voice in expending the money they annually pay into the public treasury, sometimes wonder why men do not make the roads straight with the bridges; why they do not decree that railroad grades, ditch banks and other unsightly places where the native covering of the earth has been destroyed, should not be sown to clover, grasses and flowers. Why not improve the school-yard, and give each child horticulturally inclined (for all are not) a plant or flower to cultivate as he will? Why not open the church doors every day that a poor tired mortal may drop in at any time for a moment's silent communion with the Great Over-soul and take heart for further conflict with the world?

And now, if I have said too much (it can scarcely be too little), forgive! and believe me only a well-wisher for the public good and an humble but faithful member of a society whose aim is to leave the world better than we found it, by educating and encouraging each other in the study and the love of nature; since only in her presence is humanity "*at one*" with God.

ALBINA L. WASHBURN,
December 10, 1888. Loveland, Colo.

REPORT
OF THE
Northern Colorado Horticultural
SOCIETY,
FOR THE
YEAR 1889.

OFFICERS.

PRESIDENT,
JAMES ACKERMAN, Hygiene.

SECRETARY,
S. E. ALLEN, Loveland.

TREASURER,
I. H. DICKINSON, Loveland.

EXECUTIVE COMMITTEE,
C. S. FAUROT, Boulder. A. E. GIPSON, Greeley.

COUNTY VICE-PRESIDENTS,
W. B. OSBORN, Larimer. W. L. PORTER, Weld.
G. W. WEBSTER, Boulder. DAVID BROTHERS, Jefferson.
ELISHA MILLESON, Arapahoe.

NAMES OF MEMBERS

OF THE

Northern Colorado Horticultural Society,

FOR 1889.

| | |
|---------------------------------|-------------|
| James Ackerman | Hygene |
| Mrs. Louise B. Taft | Ft. Collins |
| Mrs. W. W. Taylor | Loveland |
| A. N. Hoag | Ft. Collins |
| Elrsha Milleson | Denver |
| Mrs. A. L. Washburn | Loveland |
| P. D. Goss | Loveland |
| Alfred Wild | Loveland |
| Mrs. A. Wild | Loveland |
| Volney Chapman | Loveland |
| David Brothers | Denver |
| Alex. Shaw | Denver |
| W. B. Osborn | Loveland |
| Mrs. J. S. McClelland | Ft. Collins |
| E. S. Allen | Loveland |
| J. A. Little | Loveland |
| S. W. Cole | Berthoud |
| Mrs. M. J. Telford | Arvada |
| Andrew Buchanan | Loveland |
| C. S. Faurot | Boulder |

PROCEEDINGS
OF THE
ANNUAL MEETING
OF THE
NORTHERN COLORADO
HORTICULTURAL SOCIETY,
HELD AT

Loveland, Colorado, December 12, 13 and 14, 1888.

The annual meeting of the Northern Colorado Horticultural Society convened in the Opera House, Loveland, Wednesday, December 12, at 2 p. m., with PRESIDENT MILLESON in the chair.

HON. LYMAN PORTER, of Loveland, welcomed the members of the Society in the following address:

Ladies and Gentlemen of the Northern Colorado Horticultural Society:

To me has been assigned a pleasant task, that of extending to your society, collectively and individually, a cordial welcome on behalf of the civil authorities, as well as the citizens of Loveland.

I beg to assure you that an appreciative interest will be taken in your deliberations.

It is required by the goddess, at whose shrine you serve, that her subjects should be ever vigilant, that her interests should be zealously guarded and she bestows her choicest blessings on those only who, by constant

blessed with a soil of wonderful fertility, you have in your possession the key to a large measure of prosperity.

And, in conclusion, allow me the privilege of saying, that the citizens of Loveland, expressing to you their appreciation of the honor you have conferred upon them, by selecting this as the place for the Fifth Annual Meeting of your Society, extending to you a cordial welcome, sincerely hoping that you will remember your visit here with pleasure, that the same may be renewed, that individual acquaintance will be extended; hope that as a society and as individuals your fondest desires may be more than realized.

PRESIDENT MILLESON responded in his usual pleasing and earnest manner, after which the Secretary made the following report:

SECRETARY'S REPORT.

I herewith present a summary report of some prominent features of Colorado horticulture for the year now drawing to a close.

It is the duty of the Secretary of this Society in his annual report to consider practical topics in horticulture when there are no standing committees to make such reports. But owing to lack of knowledge in matters horticultural outside of my own locality, I am unable to make a complete report for the Northern district.

The winter intervening since our last annual meeting has been a test one for the varieties of orchard fruits grown in Northern Colorado. The thermometer indicated on two occasions a drop to twenty-eight degrees below zero. The highest temperature during the winter was seventy-two degrees above zero. These variations

are wonderfully trying to tree and plant growth of all kinds out of doors. Added to this low temperature we had a very dry winter and spring, with but little water for irrigation until our trees were well advanced in leaf. It is not to be wondered at then that some varieties of orchard fruits succumbed.

Trees not deeply rooted and without sufficient moisture in the soil to supply the drain upon their stems and branches by frost and warm dry winds are sure to go under regardless of the question of constitutional hardiness. The lesson to the tree-grower is this, that all young and hence necessarily imperfectly rooted trees should receive careful attention, in regard to irrigation, to enable them to winter safely. The use of a mulch for young trees is also to be commended in that it conserves such moisture as falls, which we may apply to their roots. To keep a mulch in place a little earth is a necessity in this climate.

The leading varieties of the apple killed with us the past winter are the following:

Northern Spy, Huntsman's Favorite, Newton Spitzenburg, Maiden's Blush, Princess Royal, Lady Henniker.

White Winter Pearmain is delicate when young. We lost one tree out of three. The other two were injured in the branches, but their trunks were sound.

Of varieties of the apple that pleased us in this locality we will mention Carolina, Red June, McMahon's White, Wealthy, Gideon, Yellow Transparent, Utter's Red, Tetofsky, Vandever Pippin, Sheriff, Roman Stem, Flory Bell, Lady's Sweeting and Ben Davis. These are mostly summer and early winter varieties.

Red June is liable to overbear, the fruit to become small and the tree to be short-lived. It holds its leaves longer in the fall than any other variety that we grow.

McMahon's White is a Wisconsin apple, coming into bearing in this locality. The tree is vigorous, very spreading when young and perfectly hardy. The fruit is large, pale yellow, with a blush in the sun much resembling the Gideon. The latter is also a new variety coming into bearing in this locality; its habit is upright and of great vigor.

One tree out of three blighted badly in a closely protected orchard. In a more open situation it would probably escape contagion.

Of winter varieties Ben Davis still has the lead as the most profitable and productive kind in this region. Sheriff apple is one that commends itself to fruit-growers for this locality. The tree is, I believe, perfectly hardy and an abundant bearer of medium-sized, highly-colored fruit, not rich but of better quality than Ben Davis.

Roman Stem is another good keeper. Tree productive when eight or ten years old, moderately vigorous, spreading and very hardy. Fruit of medium size, yellow when ripe, sprinkled with patches of russet; quality very good.

Flory Bell, a roundish, conical, yellow, early winter apple, is hardy, and will prove productive with age. It has fruited in Northern Colorado for the first time this season, and holds its leaves up to the middle of December.

Sweet Pear is a vigorous, hardy and productive variety; the fruit is medium to large, yellow with a blush in the sun, and would keep in a good cellar until January 1.

Lady's Sweet is another desirable keeper. Downing says that this is the finest winter sweet apple cultivated in America. It keeps in a good cellar until May. The tree is hardy and an annual bearer in Northern Colorado.

In selecting varieties for profit many things are to be taken into consideration, not the least of which is that of not dropping early. Late apples gathered too early will not keep.

An excellent quality of the Ben Davis is that it does not drop. Other varieties, like the Tallman Sweet, do, and are less valuable on that account.

The Russian varieties prove as a rule to be more subject to blight than are those of American origin, but are perfectly hardy. A few of the Russian have borne fruit in this locality, the best of which is No. 469, a green-skinned variety and a good keeper.

The notion is too prevalent here, as elsewhere, that an orchard once planted will take care of itself, which is a fallacy anywhere. But if the tree-grower is wise enough to manure and cultivate his ground and to scrape, wash and prune his trees, he is rewarded by vitality and fruitfulness.

There is a tendency among some fruit-growers to allow all their trees to overbear. If trees bear heavy crops of fruit annually or semi-annually they must be fed. If not, they will lose in vitality and be short-lived. Some kinds are liable to overbear, especially Red June, Winesap, Lady's Sweet, Ben Davis and Sheriff. Bearing trees should make annually twelve inches of growth, to enable them to perfect a crop of fruit and maintain their vigor.

What is needed by the commercial orchardist is a new apple possessing the qualities of the Ben Davis with the Jonathan. This desirable end will no doubt be accomplished in time by means of seedlings from our approved varieties, that are often known to reproduce themselves from seed.

The English gooseberry should be more grown than it is, especially the Industry, Crown Bob and White-smith. Grown in partial shade these varieties will yield very profitable crops of fruit. A mulch is very desirable in their culture here as elsewhere.

The plum fruited liberally the past season. The Russian varieties, so far as they have fruited, proved to be inferior to the De Soto with one exception.

The following varieties of the species Chickasaw are not hardy in Northern Colorado: Indian Chief, Jennie Lucas, Robinson and Early Red. The most reliable and profitable is De Soto.

The culture of the pear is as yet in its infancy in Northern Colorado. The Bartlett succumbed with us the past season. Belle Lucrative, Flemish Beauty, Indian Chief and Duchess are very promising. The Russian pears are all hardy, but I fear subject to blight.

The season just closed has been remarkable for the introduction of some insects new to Colorado horticulture. These and others we may expect to have to contend with each recurring season.

So that whatever of success may crown our efforts in the future will be the result of watchful care on the part of the grower and the application of approved remedies for their destruction at the right time.

The past season's work has demonstrated thoroughly the efficiency and safety of the application of Paris green for the destruction of the codlin moth in the arid region. Blight of the apple and pear has continued to prove destructive to varieties of these fruits in Northern Colorado, especially when grown in low and closely protected situations.

Rusts and mildew are subtle enemies of our fruit-growers, and how to baffle or avoid them can only be known when we know more of their life history.

In vegetable gardening the chief requisites to success are:

First—A rich soil. It can not be too rich, and it should be susceptible of easy and thorough irrigation.

Second—The seed used should be true to name and of unquestioned vitality.

The varieties of the pea to afford a succession during the season are Henderson's First, Alpha, the earliest wrinkled variety, and Champion of England.

The varieties of the cabbage for a succession are Wakefield, Henderson's Succession and Premium Flat Dutch.

Among tomatoes a great advance has been made in the habit of this plant in the production of the variety Dwarf Champion. Purchasers of seed of this variety will not be disappointed.

The earliest and most desirable varieties of the pepper for this region are the Golden Bell, Oxheart and Ruby King.

Of beans, the earliest of the bush are Red Valentine and Long Yellow, both fit for use in fifty-five days from planting.

The earliest pole variety is the Case Knife, marketable in seventy-seven days. Of the wax varieties the Black Wax was fit for use in fifty-eight days.

Musk melons require from sixty to one hundred and six days to ripen in this region. The earliest are the Large Yellow, Ward's Nectar and Emerald Gem.

The most desirable varieties of the onion for Northern Colorado are the Queen, Early Red and Yellow Danvers.

Of cauliflower, nothing is worth growing in this region except the best strains of Snowball and Early Erfurt.

Among the varieties of the carrot the most productive are the Danvers and Oxheart for table use.

QUESTION BOX.

QUESTION: What are the advantages or disadvantages of mulching young trees?

MR. BROTHERS: I believe a mulch to be desirable to young trees, because valuable in keeping the soil cool and moist, and prefer well rotted manure for such mulch.

DR. SHAW: Find an advantage in cow manure. It conserves moisture.

MR. ACKERMAN: A permanent mulch is a disadvantage, because it induces surface rooting.

Use mulches in the middle of the row, instead of around the trunks.

The Walbridge has a tendency to root near the surface when mulched around the tree.

MR. GOSS thought trees maintained themselves better when not mulched.

MR. ACKERMAN said trees planted in irrigated ground did not need much irrigation because of the seepage water in the soil. We use too much water as a rule.

MRS. WASHBURN: Why do trees lean so positively to the southeast?

MR. ACKERMAN: It is due to keeping the soil too loose at the surface.

MR. OSBORN: I believe in thorough irrigation very late in the fall.

On motion, adjourned to 7:30 p. m.

EVENING SESSION, 7:30 P. M.

Called to order promptly at the hour named, PRESIDENT MILLESON in the chair. First on the programme for the evening was a paper on "The Apple," by DR. SHAW:

THE APPLE.

It is said the allegorical tree of knowledge was an apple tree, and the old mythologists endowed its fruit with wonderful virtues, and among the heathen Gods there were apples fabled to possess the power of conferring immortality.

Among the most tempting trees in the Garden of Eden, it is said of Mother Eve that she chose the fruit of the apple to make a conquest of Adam. No fruit is more universally liked and generally used than the apple. The apple tree is a slow grower, but in some instances lives to a good old age, and grows to an enormous size. It is said of one tree in Plymouth county, Massachusetts, its girth is twelve feet five inches and produced in one season twelve and one-half bushels.

The apple tree is most perfectly naturalized in America and its success is more strongly marked here than any in other parts of the world. In a practical point of view, to what extent can Colorado claim to be the home of the apple? In response to this inquiry, I have for eight years past been a close observer of the causes promotive of success in a prominent degree. The meteorological record is favorable to that portion of Colorado on the Eastern water shed of the Rocky Mountain range, and the valleys of the West side of the range below an altitude of 6,000 feet, that has command of irrigating water. In all instances where apple trees have been properly cared for, success has been the rule. The records show a more equitable temperature than any other State East of Colorado, less zero temperature and more bright sunshine. There are no climatic causes preventive of apple growing success to any more surety from the Northern to Southern line of the State.

The apple belt as I have found it, extends into New Mexico, a distance from north to south in Colorado of about 600 miles; the width of the apple belt will be bounded by the probability of obtaining water for irrigation and proper culture. The constituents of soil to grow apple trees varies in given localities; as a rule a clay loam is best for the reason that a clay soil retains moisture in an arid climate, soils strongly impregnated with calcarious or lime matter have their fruiting qualities very much heightened. The quality and quantity of apples depend much on culture, nature of soil and locality, proper tilth is required in the growth of an apple orchard as well as the growth of field crops. The object lesson before you on your fruit tables is a demonstration that Colorado is par excellent an apple country. It would needless be a waste of time in a detail reference to the apples on exhibition. The further extension

of this paper will be of more interest to learn of the condition of apple growing south of Denver as I found it on a recent visit the current season. As a starting point I visited Fremont county and found the following conditions of orchard crops unusually good. The crop of this county for 1888 is about 30,000 bushels. The orchard visited first was Dr. Craven's, a plantation of ten acres, got fifteen varieties of winter apples, soil adobe, trees 7 years old, healthy and under fair cultivation.

J. H. Harrison—Plantation of 1,400 trees, 800 of which were in bearing; soil adobe; trees healthy. Orchard grounds seeded to red clover, and apparently doing well; got fifteen varieties of fine quality; age of trees, seven years.

R. A. Gardener—Plantation of 600 trees; got eleven varieties, which were unexceptionally fine—large in size and superior in quality. Soil different in quality, a clay loam intermingled with sand. He has a plantation of trees, eight years old.

W. B. Felton—Orchard on the south side of the river; sandy loam predominates; his plantation consisting of 900 trees, 250 of which are pears. Crop of apples for 1887, 1,300 bushels; for 1888, 2,000. For culture and care this is the model orchard of the State. Seven years old; got eighteen varieties.

John Lock—Plantation of 800 trees, most of which are in bearing; age, eight years; got fourteen sorts of superior kinds.

Henry Gerton—Plantation of ten acres; got thirteen varieties; adobe soil; specimens fine and good in quality; trees seven years old.

W. C. Catlin has the oldest plantation of trees in Fremont county; an off-year this season. Has in all a

plantation of about 1,000 trees; got but four specimens; oldest trees, twenty years old.

S. H. Glenville has a small plantation, seven years old; got four varieties.

W. C. Cook—Plantation of 150 trees; got two varieties of trees, five years old.

J. W. Johnson—Plantation of 150 trees; got numbers of varieties, seven years old; soil, sandy loam.

B. C. Green, Beaver Creek, has a plantation of 1,000 trees, well cared for. Estimate of present year's crop, 1,000 bushels. Got ten varieties; trees, seven years old.

John Pierce—Plantation of 2,000 trees; about 800 in bearing; got eight varieties. Yield of 1888, 1,200 bushels; soil, clay loam, strongly impregnated with lime.

J. A. and G. H. Toof have an interesting clump of trees (seedlings), the history of which to a practical tree grower is of more than ordinary interest. In the year of 1867 a barrel of apples was bought in Denver and the seed planted in the nursery and have grown without removal for twenty-one years in the same place. A large number of these trees have fruited the present season. We picked fifty-four specimens from different trees and they have been on exhibition at the Pueblo fair. The size, beauty and quality, among fruit men, have been universally admired. These specimens are now in store and will be a subject of interest for discussion at the January meeting in Denver of the State Horticultural Society.

Jesse Fraser—Forty-eight varieties of apples. He has a plantation of thirty-five acres, numbering 3,000 trees. His trees in bearing will yield about 12,000 bushels for market the present season. Oldest trees about twenty years.

John Gravestock, from his experimental garden—Six varieties of apples. Mr. Gravestock has in stock many of the novelties in the grape and fruit-tree line.

In this connection the thirty-five acres of growing nursery stock by Dall Deweese, of the Ironclad nursery of Cañon City, is a treasure to Arkansas valley fruit growers.

There are a number of varieties and orchards in Fremont county I did not have time to see. The small fruit crop of that county was a failure the current year.

Pueblo county was represented in the fruit line at the fair as follows:

J. W. Brooks, with thirteen varieties of apples, three of pears, one of crabs, and one of plums. E. F. Bartholomew—twenty-one varieties of apples and three of pears; H. E. Hayden—eight varieties of apples and four of plums; R. A. Gilmore—four varieties of grapes and one of pears; Jacob Haver—four varieties of grapes and one of pears; J. S. Thompson—several varieties of pears; Joseph Reece—a lot of plums; Mrs. Barnard—twelve varieties of apples and one of Captain Jack strawberries.

Mr. William Locke, from Farmington, N. M., had on exhibition a general display of a fine variety of fruits, consisting of nineteen apples, eight pears, seven grapes, ten peaches, four plums, two quinces, prunes, one apricot and one nectarine.

Mr. Locke has sixty-five acres in fruit, containing 5,000 apple and 15,000 peach trees, and a general variety of small fruits. He has the fruit bonanza of the Rocky Mountain region.

Mistakes—The critical observer learns as much by mistakes as by success. In my tour among the orchards of the State, I note an almost universal mistake of plant-

ing apple trees too close; as a rule most of the orchards are planted with the trees only fifteen feet apart, they should be twice that distance apart. I notice another common error in the management of orchards, that is, permitting trees to form tops very low-headed; this results in growing trees all limbs and no trunks. Limbs growing from same point on the trunk makes a fork for the lodgement of snow and ice, which freezes and bursts the tree and brings on early decay. The best results in growing trees, is a trunk about five feet without a limb, and no two limbs starting from opposite points on the trunk so as to form a crotch. An unsymmetrical, shapeless tree is the result of cutting off the terminal buds, if the shape is objectionable, better discard the limb entire and cut it off close to the trunk than cut off the terminal buds. As a rule, in the formative stage of a top, the terminal bud of the leader should be kept harmless; there is a reciprocity of attraction between the functions of the rootlets of a tree and its leader, which cannot be broken without weakening the vitality of the tree.

As a rule, spare the knife in transplanting trees from the nursery to the orchard. Let the job of shaping trees be done after the vitality of the tree is fully established. To wound a tree of little vitality is to increase the chances of its death.

I note a common error in orchard culture, is in planting small fruits in orchard grounds, such as blackberries, raspberries, currants and gooseberries. Crops of this kind should be discarded in orchard grounds, for the reason of being too exhaustive of plant food. The best result is found in dedicating grounds to orchard culture alone. There is no more promise of success in the planting an orchard without culture, than in planting a field of corn without proper tilth. After the first year's

growth, as a rule, there is more need of good culture than much water. I am inclined to think that the best results are produced by good culture, and water less than generally obtains.

For money and profit the varieties of apples should be restricted to as few kinds as will give a succession of fruit the year round. My choice would be the following list:

Summer—Sops of Wine, Duchess of Oldenberg, Red Astrachan, Red June, Early Harvest.

Fall—Autumn Strawberry, Summer Queen, Buckingham, Maiden's Blush, Twenty Ounce, Fameuse or Snow, Bailey Sweet, Grimes Golden, Wealthy.

Winter—Ben Davis, Walbridge, Jenet, Jonathan, White Winter Pearmain, Utter's Red, Wolf River, Plumb's Cider, Vandaver Pippin, Northern Spy, Talman Sweet, Isham Sweet, Rhode Island Greening, New Town Pippin, King of Tompkins County.

ALEX. SHAW.

DISCUSSION.

MR. ALLEN: Would you advise trimming two-year-old trees considerably branched—as severely as demonstrated—to a whip, and when?

DR. SHAW: I would advise bud trimming in June, by rubbing off buds that will form branches where not wanted.

MR. BENSON: Does any one know how "King of Tompkins County" succeeds in the State?

MR. OSBORN: Think Red Astrachan rots too soon to be profitable.

DR. SHAW: Would recommend Bailey's Sweet as very desirable.

MR. BROTHERS: I like the Ben Davis apple for market. Don't agree with DR. SHAW as to the Astrachan. It is a good cooking apple; could market all I could raise. It is a tardy bearer, but I pick as soon as large enough—before it gets thoroughly ripe. Apples keep much better to exclude air as much as possible.

The time allotted to the discussion of this paper being exhausted. MRS. BENSON'S paper on "Floriculture" was called for and read, as follows:

FLORICULTURE.

BY MRS. A. S. BENSON.

An article on floriculture, from the pen of a professional, should be a clear, concise statement of the best methods of cultivating and caring for flowers. An article on the same topic, from the pen of a farmer's wife, who has had little experience must necessarily be "a talk about flowers." My only excuse for reading a paper on such a subject is, "the committee told me to." A south or south-east exposure is best for a flower-garden. Still if you haven't it, comfort yourself; you can lay all of your failures to the unfavorable exposure and you can do very well with hardy plants by having a hedge, or tight board fence to shelter your plants from northern blasts. Next you need a good soil. If naturally sandy, so much the better. If not, it is best to mix enough sand with the natural soil to make it work easily and prevent its baking. Fertilizers may be used in either case. Every fall I see people raking dry leaves from their lawns and burning them and I say, "What a pity to waste so much," for nothing is better for flower-gardens than well-rotted leaves, and even if they are to be burned, it would be better to wait till spring, as the

leaves are a great protection to the grass roots, and nothing makes a better mulch for herbaceous perennials. As this flower-garden is for women who do, at least, a part of their house work and attend to their flowers, except digging the beds, which we hope the men will be gallant enough to so do, what flowers shall we have in it?

Of course, each woman will have her own special favorites; but where attention to plants must be limited, a smooth lawn dotted here and there with perennials, both the wooded and herbaceous varieties, will be very satisfactory. Near the house may be a few beds for bedding plants, and a small variety of the best annuals. Over the patch, and at the most sunny windows, train some climbers. Don't darken all of your windows, even with flowers.

I am very sure that before sowing time in the spring, you get a seed catalogue, and, at nearly every variety so bewitchingly described there, you say, "I must have a package of that, and that, and that," till you find you have selected more than you really feel able to buy. Then you go over the list and revise it, with a sigh for each one you cut out. Finally, you buy fifteen or twenty different varieties, and wish you could have every kind offered. Many annuals, to the woman with but little time to attend them, are a delusion and a snare. Better one kind well attended than twenty or thirty fine varieties smothered in weeds, half-hidden by encroaching grass. For bedding plants, as for house plants, geraniums come first on the list. I like small beds, each entirely filled with one kind, or, if you only have a few plants and wish them all in one bed, mass each color together.

All who keep as house plants flowers suitable for bedding out may have a quantity by making cuttings in

the winter, and rooting them in wet sand. Make the cuttings of new growth so as to have one or two leaf buds on each. Set in shallow dishes of clear sand. This sand must be kept very wet all the time, never being allowed to become even moderately dry.

After the roots are well developed, plant in earth using small pots, or several together in boxes. Keep in a thrifty, growing condition, and they will be found all right for bedding-out in the spring.

Of course if you are near a green-house you can buy bedding plants at small cost, and save yourself all of this work.

The China and Tea roses make beautiful bedders and with a little protection may be left in the ground through the winter. Bend the bush over carefully, peg it to the ground, and cover with sods, which can be removed in the spring. Do not do this too early in the fall, or they will rot. Probably about the first of December is the best time. Roses seem to grow well in almost all soils if made rich enough, but they particularly like clay soil. When bedding your plants, shade them till well established. Fuchsias may be used as bedders by planting them in a shady place, well sheltered from the wind. Plants sent by mail often have bruised roots. These should be cut off smoothly, the top cut back, and the plant should receive only a limited supply of water, till it shows signs of growth. The reason for this is plain; you all know it is not wise to feed a sick person too much, and a plant with its feet bruised and its head cut off, is in rather a sickly condition. Pansy beds are always lovely, and especially so in the spring and fall when the weather is cool, as heat does not agree with them. They need a shaded location and plenty of water. Chrysanthemums for fall flowers are unsurpassed. Cuttings rooted in May and

made stocky by cutting back till they are fine, bushy plants, will bloom in October.

If wanted for winter flowers do not let them bloom out of doors, but cut them back in October and pot them, letting them stand in the shade till they are used to their new quarters. Remove to the house before freezing weather. I have often seen beds of beautiful geraniums which the owners were unwilling that Jack Frost should destroy. As the cold weather approached they potted them and brought them into the house. The plants were so beautiful they could not sacrifice a single leaf or flower, and, of course, the plant grew yellow and died.

A better way would have been to have made cuttings of tender new growth from each plant, rooting them in wet sand as before described. These will make thrifty plants for winter. If you must save the old plant cut it back to bare stems. Don't spare a single leaf and your plant will probably live and resume its pristine beauty. The young plants, however, are to be preferred.

It is said that perennials bloom better if divided and re-bedded every three or four years.

For window plants it is best to have one more window in the room where they are to be kept than is needed to give the room sufficient light. It isn't wise to sit in twilight even for the sake of having flowers. They must have sunshine, light and air. Your children need these too. True, you can send the latter out of doors, strain your own eyes every time you wish to thread a needle, and light a lamp every time your husband wishes to read a newspaper, but all things considered, an extra window is best. A double window or a bay-window is of course to be preferred.

A window garden is very pretty, though, on some accounts, I prefer plants in pots. Have a box lined with zinc or galvanized iron, mounted on legs to bring it to the height of the window-sill. The box should be as long as the window is wide, six inches deep, and as wide as you wish it to project into the room. Fill with rich earth. In one of the corners nearest the window set an English ivy; in the other some other pretty climber. Train these around the window. Set as many plants in this small garden as you think the soil will support. Along the window-frame may be brackets for potted plants, and from the top of the window a hanging basket may depend. If well cared for, this garden will be a thing of beauty. A false bottom to the box, with holes to insure drainage, is an improvement. Nearly all hanging baskets are filled with vining plants. They are quite as pretty and effective if some small growing plant, like a Tom Thumb fuchsia, or a dwarf geranium, be placed in the center, with vines and creepers set around it, and it makes a change from the regulation hanging basket.

The best way to water a hanging basket is to dip it in a pail of water, till the ball of earth is well soaked. Suspend it over the tub to drip before returning to its place. For the number and kinds of plants to be kept you must be guided by the space you can spare for them, and above all, by the time you can rightfully give to their care, without neglecting more imperative duties. If you have not much experience, commence with those most easily cared for, like geraniums, fuchsias, Bengal and tea roses, and similar plants.

The tea-plant is said to be easily cultivated, and to make a pretty addition to our stock of house-plants. It is evergreen, will grow to six feet high, but may be dwarfed by cutting back. It bears pretty white flowers.

an inch across. It does best in a room without a fire, but must be kept from freezing. In summer it should be placed out of doors in a partially shady place.

Geraniums and many other plants are often troubled with the aphid, or green fly. The best remedy for these, one used by all florists, is fumigation with tobacco. Those who have green houses usually use tobacco dust, shipping it from tobacco factories, but any tobacco will do. If the plants to be treated are in pots, place them on the ground, cover them with a large box and set some tobacco smoking under the box. It must not blaze or the leaves on your plants will be killed, and possibly the plant itself. Where you cannot place the plants under cover to fumigate them, as in a window garden, Henderson recommends steeping tobacco in water till the liquid is the color of weak tea, and washing the plants with this.

The red spider is a terrible enemy of house-roses, fuchsias and many other plants. It must be exterminated or it will kill the plants. It is so small that you can hardly see it with the naked eye, but its work is plainly discernible. The leaves of the plant will be webbed, curled and present a dried appearance. The cause is hot, dry air, and water is the only remedy of which I know. If you have a fire in the room with your plants, keep an open dish of water on the stove, but even the steam from this will not keep the air damp enough, and the leaves of the plants must be frequently washed.

Where a plant has been attacked, fill a tub with water, slightly warm. Hold the hand over the ball of earth to prevent its dropping from the pot, and turn the plant down into the water till it is entirely covered. Move it gently back and forth in the water. Do this two or three times a day, till the pest is removed, after which twice a week should be sufficient to keep them in

check. If your plants are not movable you must depend on washing the leaves. Scale-leaf attacks English ivys, oleanders and other wooded plants. It must be removed by washing, scraping off with a little stick and the sponge will not remove. Washing with whale-oil soap is recommended for mealy-bug. One pound of soap to five gallons of water. Persian insect-powder is said to destroy many plant pests, but I have never tried it.

Whatever you do, do well. One well-kept plant will give more satisfaction than twenty half-kept ones, especially if the children are half-kept too, because of the time spent with the plants.

It is near the Christmas-time. I saw a few days ago a Christmas present that had been prepared by a young lady to send to a friend in one of the Eastern states.

As this is a talk about flowers, I will tell you about it.

A NICE GIFT.

It was only a bright covered scrap-book, but on each alternate page were arranged nicely pressed specimens of our native flora. These were in groups and wreaths held in place by slips of white paper neatly gummed over the stems. When I saw it I thought, "how I wish some far off Eastern friend would send me such a present of the wild flowers of my native State." The sweet trailing arbutus, the bright pink blossoms of the swamp apple, mountain laurel, wild columbines, field lillies, ox-eyed daisies, buttercups and many others that used to delight my childish heart. I think similar gifts between friends living in different regions would be very suitable and satisfactory.

A UTILITARIAN.

"What are you doing, John?" asked a young wife of her husband who had already started his plow in the door-yard.

"Plowing," was the laconic answer.

"But you are not going to plow up the door-yard?" remonstrated she.

"Yes, I am! I have only got forty acres of land and I've got to make every foot count. This patch will raise potatoes enough to last us all winter and some to sell."

"Do leave enough for a posy-bed here by the door," pleaded she.

"Posies!" said he contemptuously. "I guess you'll find potatoes 'll fill up better than posies if you're hungry. I think it's a foolish waste of time for a woman to be fooling around a posy-bed. Potato-blows are pretty enough posies for me."

"How nice and well kept your garden looks, Mrs. Green," said a young girl, looking over the fence, where an old lady was at work among rows of well trained plants. "But aren't some of them rather queer plants for a flower garden?"

"Tisn't a flower garden," replied the old lady a little stiffly. "These are what I call yarbs. Every one of 'em is good for med'cine. I never wasted my time over flowers that wa'nt good for nothing, I think its wicked."

The girl laughed. "What do you think the Lord put them here for?" she asked.

"I'll tell you!" said the old lady, growing confidential. "I really believe there isn't a flower that grows that isn't good for some kind of disease. I do

wish I knew what they are all good for. There wouldn't be many sick folks around me if I did."

"Where is your wife?" I asked of a gentleman whose house I approached one bright spring-day many years ago.

"Out worshipping her flowers," he answered, rather grimly.

I went around among masses of shrubs to find her. She was smoothing some newly-dug beds, and looked very tired. "Good-morning," said she, rising. "Haven't I got a sight of flowers? I have twenty-six different kinds of roses and ten different kinds of lillies. See them just peeping out of the ground. I'm getting these beds ready to set out my house-plants. My room is crowded with them."

We went into the house. The breakfast-table stood as the family had left it. The sitting room was literally crowded with plants, some of them nearly large enough for trees.

"I'm so tired," said she, sinking into a chair, and beginning to put up her hair, which had fallen down. "Eleven o'clock," said she, glancing at the clock. "The children are at school, and John will have to eat a cold bite for dinner to-day, for I must drive over to Mrs. Smith's this afternoon. She has a kind of lily that I haven't, and she said she would divide it with me. If I don't get it right off, it will be too late to take it up. I do wish," she continued, "that I could live and do nothing but work with my flowers."

"How about your children?" said I.

"Oh, I would like to have some one to take care of them."

"You would make yourself a woman of one idea," I said.

"I believe in people of one idea; they amount to something, in one direction at least."

"Yes," I said, "one-sided people and geniuses are excellent things for posterity, but posterity has to appreciate them. They are usually very uncomfortable persons to live with."

These are extremes. Happy they, who in this, as in all other things, shall strike the golden mean.

DISCUSSION.

MRS. WASHBURN: When is the best time to make pansy beds, in the spring or fall?

MRS. BENSON: Raise in hot beds or house pots.

DR. SHAW: I think sowing the seed and waiting for the plants is too slow. It is economy to buy the plant of the hot houses.

MR. MILLESON: Thought it was a pity that all the young men and women of immediate vicinity was not present to hear the paper just read, to encourage the planting of flowers. Was raising some flowers himself; had several thousand roses.

Adjourned to Thursday morning, 9:30 o'clock.

THURSDAY, 9:30 a. m.

Meeting called to order by PRESIDENT MILLESON.

Music by Glee Club.

"Vegetable Culture," by G. M. ANDERSON, was called for, having been laid over from the previous evening, and was read by the Secretary, MR. ANDERSON not being present.

VEGETABLE CULTURE.

BY G. M. ANDERSON.

In writing on vegetable culture with an experience of only seven years, I can not hope to say anything that is new, or much that will interest others whose experience is doubtless much more extensive and varied than mine; and yet I realize the fact that in the interchange of ideas I am always benefited, and on the principle that "we are never too old to learn," perhaps my views may aid some in pursuit of that which we all hope to attain, namely, success.

All writers agree that there are certain things to be observed in order to obtain success in the cultivation of vegetables. And first I will mention the preparation of the soil as one of first importance. The neglect of a thorough preparation of the soil is a point from which we are all liable to suffer, in a country like this, where it is frequently the case that we do not have in the spring sufficient moisture to cause seed to vegetate without irrigation; and water can not always be had sufficiently early to use for the early planting of vegetables for market. We all know, if we do not practice it, that the thorough preparation of the soil in a dry season particularly is indispensable to secure a quick germination of seed; and that unless the soil is well prepared seed can not be properly put in, so as to insure germination.

After the preparation of the soil and good seed, careful planting is a matter that is very apt to be neglected. Haste in this, as in other things is sure to make waste.

A matter of paramount importance in this connection is the procurement of good seed. How many of us there are that after observing all other things necessary to

success, suffer from neglect, slovenly culture, or the want of any culture; consequently an abundant growth of weeds and grass robs us of our crops.

It can hardly be expected in an article like this that I take up even a large part of the vegetables on this list, I shall therefore select such as I have had most experience with.

In the planting of asparagus I am convinced that deeper planting and more room will give better results. The effects of the wind in the first place and the fact that each year the crown of the plant comes a little nearer the surface and the disturbing or tearing the roots with the plow render deeper planting advisable. The roots of asparagus do not strike down but spread out like a fan near the surface and therefore are easily reached with the plow if planted too shallow. Too much manure cannot be used in planting or in after culture. Irrigation at least once a week is imperative to secure good results. My opinion is that the time is not distant when the canning factories will take all of the surplus that can be produced. Asparagus is of all vegetables least liable to injury from insect pests; and as one planting does for an indefinite time, and frost or hail injures only that that is above the ground at the time, and the crop can be gathered daily from the same ground from the latter part of April until the first of July, it is a profitable crop.

Beets for an early crop should be planted as early as the ground can be worked in the spring. For winter use they may be planted in the middle of July. Indeed, it is better to plant late for winter use, as if planted too early they grow too large.

Beans are also a profitable crop and easily grown, and as large quantities are used by the canning factories,

persons living at a distance, but with good shipping facilities, can easily get them to market fresh, as the wax varieties will ship if perfectly dry. The Golden wax is the only variety suitable for canning.

Cauliflower, of which Henderson's Snowball and Early Erfurt are the best, requires similar culture to cabbage, requiring rich soil, clean culture and plenty of water. It is necessary, however, in order to grow good cauliflower to have good plants, which have not been stunted either by cold or for want of water; for if plants are stunted either before or after setting in the ground, they are almost sure to make buttons instead of good heads. One thing that is understood only by gardeners is the necessity of tying the outer leaves over the heads as soon as the head appears, to prevent sunburning or in order to have the heads bleached.

Parsnips are a crop that may be grown profitably away from market, as they are easily grown, produce heavy crops to the acre, keep well and bear shipping. The seed germinates very slowly, and I have obtained best results by planting as early as possible in the season, before the ground becomes too dry.

Tomatoes are only profitable for a near market. A crop of ten to fifteen tons per acre is not an over-estimate in ordinary seasons, but as they generally sell at \$13 to \$15 per ton at the factories when the crop is well on, and the factories frequently get more than they can handle, it is only safe to plant by contract.

It may be not uninteresting for me to add here some experience that I have had this year, farming without irrigation. I had twelve or fourteen acres of sandy loam, with clay subsoil above water. So I sowed about four acres in oats and alfalfa, obtaining a fine stand of each by the spring rains. I also planted some yellow field

corn in drills quite thick, two or three acres of Stowel's Evergreen corn in hills, two or three acres in potatoes, and about one and a half acres in onions.

The oats were burned up. The alfalfa, I think, would have come through all right but for the web worms, which took it when about three inches high, and killed it completely. The field corn did poorly. The evergreen did first rate, producing ears eight to ten inches long, and stalks five to six feet high, making the best of fodder. The onions were eaten to the ground by the web worm, notwithstanding which I had quite a number to mature measuring two and a half to three inches in diameter, and a tremendous lot of scallions. My potatoes produced only small ones, very few growing larger than a hen's egg. After the corn was up there was only one good shower and that after it was out in silk.

The next paper on the programme, "The Seedling Apple," by G. A. WEBSTER, was deferred for the present, Mr. WEBSTER not being present, and MR. HOAG's paper on "Potato" was called for, who responded with the following:

THE POTATO.

BY A. N. HOAG.

The potato, *Solanum tuberosum*, is a native of the table lands of the Andes of South America. Centuries ago it was found by travelers growing wild in Chili; at Curzo in Peru; at Quito in Equador and the forests of Bogota in New Granada, 8,694 feet above the level of the sea.

Potatoes have been cultivated at Quito from time immemorial and are the finest in the world. This city is

situated on an extensive table land at the elevation of 10,233 feet. The mean temperature of the elevation through the year is about sixty degrees and varies from this but little at any particular season. The country has the appearance of perpetual spring. There are no sudden changes from heat to cold; no violent storms of rain and wind. The land is refreshed by distilling dews and gentle showers.

The soil of these table lands, which are the uplifted beds of an ancient ocean, is generally composed of disintegrated rocks and shells of the detritus of the mountains and vegetable mould, and belongs to the geological formation of the secondary period, it is therefore, light, porous and friable, and contains large portions of sand, lime and vegetable mould. It is also naturally well drained, though retentive of sufficient moisture and from its elevated and airy location is cool and moderately dry.

Such is the native home of the potato where it grows spontaneously, renewing itself from year to year from its tubers and seeds. It retains the verdure of its foliage unimpaired throughout the entire season and when its tubers and seeds are fully matured it dies, not of any injury from external influences but because its period of life has terminated. Although the potato is of tropical origin (tropical in its latitude though not in climate) and has its favored locality in which it will grow with certainty and perfection, yet such is its adaptability that it may be grown by careful culture with tolerable success from Patagonia to Labrador and from the Cape of Good Hope to Iceland or Cape Horn to Alaska. Potatoes have been grown with some success at Fort Yucan in Alaska inside of the Arctic circle.

Early the potato was introduced from South America into Spain, they were known in the south of

Europe and in Ireland some time before being introduced in Great Britain. They were introduced into England as early as 1565 by Sir John Hawkins and afterwards into England in 1586 by Sir Walter Raleigh from Virginia and was there long known as the Virginia potato as described by Gerard in a book published in 1598. It was introduced into New England as from Ireland hence the name Irish potatoes but was not much improved at the end of the eighteenth century. In 1771 only two varieties are mentioned, a white and red, by the most important English book on gardening and was then only spoken of as good food for swine and cattle, but now their name is Legion. There were raised in the Highlands of Scotland in the year 1854, 51,357 pounds and in 1855, 74,782 pounds. At the island of Sitkia potatoes have been raised, although small and watery, thus showing they can be raised in very cold climates and high altitudes. There are difficulties to be encountered in the cultivation of the potato and they can be overcome only in part by a thorough knowledge of its origin and habits. The most difficult of diseases are rust, curled leaf, and rot, the first two are the first stages of the latter, and to avoid these we must know our soils as well as the varieties of the potato we plant, also its season of growth and maturity.

When we plant a small tuber of feeble growth we cannot expect a reproduction of a good crop, as a general principle, but one of as feeble growth as the parent planted, this may not be fully realized at once, but sooner or later it will come, for it is an invariable rule that like begets like. The healthy tuber planted must contain a certain amount of starch to perfect its maturity, as the young plant draws its nourishment from the tubers planted until the plant is large enough to draw its nourishment through the stomata and spongioles of the leaves and roots.

I do not believe in planting small potatoes as a rule when good healthy tubers can be obtained, for if I plant small ones I am liable to harvest a large proportion of small ones, and they continue to increase until disease sets in or the potato is run out. Potatoes of good size yield me large tubers in return, which give the best satisfaction; but this course is said by some authorities to run out potatoes, yet I find that most varieties are short-lived and we must make the most of them while they last. A long cultivation of the same variety in one locality causes it to become weak and unhealthy, or too long a cultivation of one variety tends to run it out.

Says T. A. KNIGHT: "I have in several instances tried to renovate old and excellent varieties by change of soils and mode of culture, but I never in any degree succeeded. Old kinds of too long planting will run out and variety will be lost." But, in my experience, before a variety is too old it helps its longevity to change the seed from one kind of soil to another.

The only remedy we have is to obtain new and excellent varieties by raising them through careful cultivation of the seed which is found in the ball. To raise from seed we plant first in the hot-bed, and as the plants advance and are large enough to pick out we select the most promising ones, and if convenient put them in two inch pots, sink the pots into the earth in the hot-bed and when they are sufficiently large and the season is far enough advanced, plant them out in open ground in the experimental plot, cultivating and caring for them until digging time, at which time we save all tubers, even those as small as peas. The season will develop the tubers so you can make selections from them, reserving the most promising ones which, by planting for the third time, you may secure some excellent new varieties worth all your trouble and expense, besides benefiting

the human family. We may by cross-fertilizing one good variety by another, obtain the flavor of one and hardiness and productiveness of the other, thereby being greatly benefited financially as well as satisfactorily.

As to the use of the potato we are benefited in several ways: As a food for man it stands next to the most important of cereal, wheat; as food for cattle and swine it is used extensively. In addition to the ordinary ways of preparing it for man and beast, large quantities are made into starch for manufacturing and culinary purposes. In Russia starch sugar is made from them. By means of pressure they are made into celluloid for cuffs and collars, and vegetable ivory for buttons and knife handles; it is also used extensively for combs and toilet sets; a kind of soap is made from them for bleaching purposes; its fiber is used as a substitute for flax; the young shoots are used for greens; the dried tops are said to be excellent winter food for milch cows, while the Irish manufacture whisky from them.

My experience in 1874-5 and 6 is, perhaps worth jotting down, as it was at that time the French blight was doing a large amount of damage in different portions of the United States. I call it the French blight because it was first registered in that country about thirty-five years before, and spread more or less over all the civilized countries of the globe, and the only sections that were free from it entirely were portions of Maine, Mexico, Texas, and a part of Michigan; and while we, on the upper Poudre, made almost a failure, about Greeley and in the mountains were raised, our and mostly Denver's supply; although they raised an inferior potato from what they now do—the leaves curling up on them and the stalks turning black, as most of the old settlers will remember well. I planted in '74, on alluvial soil, eighteen bushels of potatoes, which promised well until

about two-thirds grown, when they began to show signs of the disease, and at digging time they exhibited still more signs by my not getting but eight bushels of very inferior tubers. In '75 I planted the eight bushels and harvested none, so I planted a few next season and concluded nothing remained, except to go down to Greeley and get my potatoes, so I discontinued raising for several years. Finally, as the blight left us, one ventured, then another, and now we can come up to Greeley, or any other place, for flavor or size, or the most fastidious epicure may desire.

I am very careful in planting my potatoes. First, I select my seed to suit the season of planting, then my ground (for I never plant in the moon). My ground must have been planted to some other crop, after being manured, so as not to have fresh manure come in contact with the tubers, as on my clay loam it grows scabby potatoes. I simply plow my ground about five inches deep, dropping my seed in every third or fourth furrow (according to the size of the plow), putting the seed about twelve feet apart and covering with the plow. This I continue until the field is finished, harrowing over as soon as planted. Deep planting where we have such drying winds I find beneficial, as it retains moisture longer and gives the young shoots time to get above the ground, so they can be worked, which I do with a light harrow as soon as they appear above the soil, but, if too dry, I run the cultivator between the rows so it will be in proper shape to irrigate, as I do not run water on the plants themselves, but let it soak up from the furrow thoroughly. As soon as dry enough, I cultivate in order to prevent the soil from baking, irrigating as often as necessary, repeating the cultivation. The potato requires less water than most vegetables, and that at the proper time. At digging time I simply plow

them out, assort as I pick them up and haul them to cellar or market, as is required.

The potatoes on exhibition were planted on the last day of May, harrowed on the first of June, worked and irrigated three times during the season, dug from the sixteenth to the nineteenth of September, and a very dry season; the ground on which they were raised has been planted or sowed for fourteen consecutive years, although this was the first crop of potatoes. This ground is on a hillside, with light colored porous clay soil, underlaid with clay subsoil and shale.

My experimental potatoes, occupying two rows, in two different parts of the field, received the same treatment as the others with this exception, I selected the largest for exhibit at the Larimer fair, as also the Pueblo fair. The seed I obtained from PROF. CASSIDY, of the Agricultural College, and about three-fourths of a pound of each, with the exception of one seedling of my own, and from the result I have made out the following table, weighing the potatoes on what I considered three average stalks:

Bromwells, No. 55, white, four pounds (these were at the upper end of the row where the water was turned on); Churchills, No. 10, white, nine pounds; Arizona, red, five pounds; Rands, No. 42, white, six pounds (too much water caused above); Cassidy's seedlings, No. 1, white, six pounds; No. 2, white, nine pounds (very good); No. 3, pink, four pounds (very early); No. 4, white, thirteen pounds (very fine); No. 5, blue, eight pounds (very white inside); No. 6, white, pink eye, six pounds (resembles the wild ones); My own seedling, white, ten and a half pounds (extra good).

Now, in conclusion, let me add: Avoid having unhealthy tubers or running a good variety out. Plant

good, healthy, well-matured tubers, change your seed from low land to high or hilly land, change from clay to alluvial soils and *vice versa*. Don't continue to plant one variety too long; don't plant very small tubers, and in cutting leave enough of the tuber in one piece to give it nourishment until by its own growth it can support itself; don't plant in soil that is void of carbon and potash or lime, as we have previously shown that carbon and lime abound in the soil of the table lands where the potato grows wild; neither give them too excessive stimulent from strong and concentrated manures, as when they are subjected to high cultivation they do not ripen but grow to vines too much, thus weakening the tuber and producing less starch. A moderate stimulus produces a firm texture and vigorous constitution, a quality much needed. I have raised large tubers by using tobacco stems sprinkled in the furrow, but to continue this you soon will have a potato hard to cook, as they seem to take in the saltpetre or nitre too much and it prevents their cooking, although a small stimulus of this kind seems beneficial in irrigating; do not use too much water, as thereby you will injure the growth as well as the flavor of the potato; do not run the water directly on the plant, but between the rows, and let them be soaked at the roots through the soil. Climate influences cannot, of course, be entirely overcome, but we can plant, cultivate and water at the proper seasons, under our admirable irrigating system. Plant deep in Colorado, as at the season of late potato planting fresh plowed ground is more liable at that season to undergo evaporation; and last of all, let us join with the Irishman, while supping his whisky, who said, "God bless the man who first invented the potato."

DISCUSSION.

MR. McCLELLAND: When is the time to irrigate potatoes?

MR. HOAG: Any time when they need it.

DR. SHAW: What are the advantages to this State from the experiments of PROF. CASSIDY in raising seedling potatoes?

MR. HOAG: By getting new varieties of much value.

MR. ACKERMAN: My mode of raising potatoes is to select a good piece of ground well manured, plant in a furrow made by a plow, and irrigate twice. I used to have poor results, but have better now.

DR. SHAW: What is the earliest variety grown here?

MR. HOAG: The best variety I have is the Telephone—a small, smooth potato. Can secure two crops by careful cultivation.

MR. ACKERMAN: The Burbank Seedling yielded me about four hundred bushels to the acre. I regard it as my best variety, though late.

MR. McCLELLAND: Why harrow potatoes as soon as planted?

MR. HOAG: To level the ground and keep the air out of the soil by having it more compact.

MR. McCLELLAND: I harrow after they are up.

P. D. GOSS: Has any one tried chemical fertilizers?

D. BROTHERS: I have on corn, peas, potatoes, beans, wheat, rutabagas and mangolds. Do not remember that it did any good out doors, yet gardeners said it helped them in the hot-beds. I could not see a particle of difference although applying about what they told me. MR. TOBIAS had good success in his hot-bed. This year

my potatoes are not worth digging. Last year a neighbor did well; made his boasts he knew how to raise them; this year he failed and thinks he don't know how to raise them.

JUDGE OSBORNE: I generally do well, as I have great loamy bottom soil. Have thought Paris green hurt the potatoes as well as the bugs. In Greeley the best land is moist on the surface, but not wet enough to draw out alkali. Their soil is sandy; their irrigating is conducted on such a system that it never gets dry. Our best patch where we can run water around it not on it and lets it percolate through. On some soil it is impossible to raise good crops. Heavy clay soil is bad. Keep the moisture about even; if you let the ground get wet, then dry, then wet and dry alternately, you can never get good potatoes. I found covering one patch with straw improved it.

DR. SHAW: MR. HOAG, if you get the Agricultural College professors to analyze your soil and the seed, is it any advantage? Can you judge better what crop to plant?

MR. HOAG: Yes. My soil is mainly calcarious. I have seven varieties, all but alluvial. I take seed from the lowland for highland planting, and from highland for lowland planting and find it does well. After rotating a year or two with another crop, I can raise good potatoes. Every farmer should know the elements of chemistry and botany.

MR. COLE: Three points must be observed, good ground, good seed and good cultivation, to retain moisture. Have seen good results in growing potatoes on alfalfa ground. Alfalfa is a good fertilizer.

MR. HOAG: I find the refuse from the slaughter house the best manure for potatoes.

MR. COLE: The main secret in raising potatoes is cultivation. My neighbor Smith always does well. He carefully selects his soil—when moisture ceases he irrigates once only, but keeps his cultivator going all the time. We must plow deep in a dry year to retain the moisture—it is cheaper to plow in alfalfa than to buy fertilizers.

MR. CHAPMAN did not think deep plowing to retain moisture was applicable to this country, it might do in the East but in Colorado the dry atmosphere carried off the moisture.

MR. HOAG: If you get up early you will find a latent moisture on the cultivated land. If my neighbor will not cultivate I can by cultivation steal all his ammonia while he is asleep.

After music by the choir an adjournment was taken until 2 p. m.

AFTERNOON SESSION.

Meeting opened promptly at 2 p. m. with music, after which a paper on drainage was read by P. D. Goss.

UNDER-DRAINING.

It would seem not necessary to state to those here present—as this subject is called up—that the objects of drainage to certain localities is one of pecuniary advantage as well as of great importance. That it is year by year forcing itself upon the attention of our agricultural and horticultural communities, and a disregard of a careful consideration of its advantageous effects upon our acres of land, that year by year are now being added to the waste fields, cannot longer be prudently overlooked.

The truth of this statement is so glaring that it makes itself self-evident to any person who will glance about him as he passes along the public highways as he goes to and fro about our country; for he will discover each year many spots breaking out in new places that can be controlled in no other way.

While these quagmires are a great source of annoyance to the manipulation of our field-work they are at the same time detracting from the valuation of our fields and preventing capital from investing in our midst, and play the additional drama of forming reservoirs for the storing and spreading of disease and death to our homes and families.

There seems to be but two ways to relieve ourselves of this objectionable feature to our home surroundings. One is to stop the source from which they spring.

This we cannot well do. To dispense with our system of irrigation means barren fields, homeless plains; for nature herself has not provided this part of the domain with sufficient rain-fall to maintain vegetable life; hence, the necessity of irrigation.

The other means of relief then must be relied upon—that of under-draining.

Our lands have been so cheap that we have run around these overflowing ponds of water, not thinking them worth what it would cost to reclaim them. For horticultural purposes, which is mainly carried on near our large and small towns, and where the land is more valuable than in our agricultural districts, the benefit derived from a thorough system of under-drainage, whether the land be wet or not, will offset the cost of the work.

How to carry out such a job of work so as to derive the best results from the labor employed is the main

object. In my mind there can be no definite rules laid down. Each person undertaking the reclamation of such a piece of ground as mentioned above, will have to bring into play his own good judgment. That different locations will require somewhat different treatment, I am fully convinced.

It seems to me, though, that the right course to pursue would suggest itself to anyone. With that view of the matter I set myself at work to drain a few places on my farm and effectually succeeded in drawing off the alkali water that came out in such quantities as to entirely destroy vegetation. I began at the lower point and dug my main ditch through the land to be drained. I gave it good fall, so as to draw off the water rapidly—the ditch being about four feet deep. Into this I opened my side ditches, allowing about thirty feet for each ditch. Much depends on the soil how often these ditches should be dug. Into these ditches I place two boards sawed, one one inch wider than the other and the edge of each nailed together, making a trough something of the form of the letter "A," across the bottom of which I nailed short pices of boards once in three or four feet to keep it from spreading. Drain tile are out of the question of economy in laying drains in this part of the world. As I understand it, there is no reason why tile should cost more here than in the Eastern States, unless it shall be more profit for the maker. In connection with this article I have not thought it necessary to enter into the cost of drain tile, but would recommend boards as a substitute.

There are many other things that make a good substitute for tile. The very best drain I have on my farm is made from filling into the ditch small stones gathered up from the waste places about the farm, putting in about one foot in height, over which I string out a

layer of slabs and then fill in waste straw, on which I filled in the dirt.

Where water breaks out on a hill-side it is conceded to be the proper way, I believe, to run your ditches as much as possible direct into the hill, and then I find it difficult to control.

The great expense attached to this kind of work and the difficulty of getting help to do such work is the obstacle that prevents many from draining many of these unsightly spots. A scientific system of drainage may be desirable, yet much can be done without any such "straight-jacket style."

Give the object to be accomplished a few moments' thought. Survey with your eye the natural surroundings so as to be sure that you begin your work where the natural outlet would be, and with a strong determination and a good shovel, "pitch in," and the results will surprise you.

DISCUSSION.

MR. OSBORN referred to Ft. Collins as a sample of what drainage would do. He had helped make miles of drain ditches in New York, and they had made the best land and fruitful fields. He felt sure it would work the same here in Colorado.

MR. MCCREERY: I have done no under-draining in Colorado, but have in the East. Have used stone with good results. Think I will try *brush*, although where water comes out in quantity think it will be difficult to drain.

MR. HOAG: I have used poles with good results.

MR. ACKERMAN thought it would cost \$150 per acre.

MR. CHAPMAN: In Illinois they have for ditching, and costs about twenty cents per rod.

Following this discussion PROF. O'BRIEN's paper on "Chemistry of Soils" was read.

PROF. O'BRIEN made this paper very interesting with illustrations by means of charts.

MR. CHAPMAN: Can we do anything with "Buffalo Wallows" to work up the soil?

MR. OSBORN: I have had some experience with the "Buffalo Wallows" and used manure with success.

A voice: His experience was to "mix soil with it."

MR. MILLESON: I have had some experience with these places, and have had much trouble with them, but I found wood ashes helped.

Voice: I would ask the Professor if there is any fertilizing property in water?

Prof.: Plants derive all their nourishment from roots, and potash in water furnish nutriment.

MISS PATTON's paper on "Insecticides" was next on the programme; and being called for, in the absence of MISS PATTON, was read by W. H. MCCREERY.

After music by the choir the discussion of MISS PATTON's paper followed.

MR. ACKERMAN asking what the small bug about one-half inch long was that destroyed all his squashes?

MR. HOAG: It was the old-fashioned squash bug.

DR. SHAW: I wish to refer to a "Yankee machine" to catch the codlin moth. Take a tin pan three or four inches deep and twenty or thirty inches in diameter, fill with soap-suds, put in the center a lantern and set out at night and you will catch the moth in the soap-suds.

MR. MCCLELLAND: Do not think they can be caught that way.



MR. ACKERMAN'S paper, "The Value of Horticultural Societies," was next read:

THE VALUE OF HORTICULTURAL SOCIETIES.

We estimate the value of anything by the benefits received.

In all ages, public meetings have been held for religious and moral reforms, as well as for social intercourse, which is certainly a very good precedent for our meeting together to-day. Sometimes we think our forefathers were slow, but they have left us some very good examples, which it would be well for us to follow, and the one that interests us to-day is, meet often one with another.

Perhaps it would be well for us to consider this subject from two standpoints—financial and social. In this nineteenth century, with all the rings and trusts, it would seem absolutely necessary that we should meet occasionally to compare notes, and adopt new methods gathered from practical experience, in order to keep pace with the great whirl of the present day. And more, were it not for our Horticultural Society, the fruit-growers of to-day (to use the Colorado expression) would get left, or, in other words, we would not be in a condition to compete with our neighbors.

The world, at the present day, is run by steam and electricity, and it would not do for us to take the slow coach, if we expect to win in the race.

I expect to hear something at this meeting in regard to the preparation of the soil; the best varieties of fruit to plant, and how and when to plant them; when and how to irrigate and cultivate; gathering, sorting and marketing. I do not expect that any member of this

Society will think that he has a patent on his methods. We meet here for the purpose of giving and receiving, and when we get home, to put in practical use what we have learned from our neighbor. The old adage of two blades of grass where one grew before, is the method we need to pursue at the present day. If a box of berries or a barrel of apples costs us to produce all that it will bring in the market, where is the bread for the children? It is not a question, how to get rich? but how shall we get a fair return for our labor, and make a comfortable living for the family, and lay by a little in store for old age. The older I grow, the more I become convinced that we are, in a large degree, dependent, the one upon the other. It is not my experience, or your methods, but a combination of the whole that will bring success. By a free intercourse, or exchange of opinions, we may hope to succeed and be mutually benefited. This is one reason we are here to-day.

You say value? Yes. Our society has an intrinsic value, with the facts squarely before us. The non-producer growing rich, the poor growing poorer. No protection to the hard-working man. Our homes, many of them mortgaged to those who do not soil their hands, and then talk of fighting the battle single handed.

It cannot be done. We need, and must have, better methods—concert of action. Where shall we get them if not in meetings of this kind? Horticultural societies, granges, farmers' alliances, agricultural meetings everywhere; we must not be content to sit down and leisurely fold our arms and say it will be well. No. Too much money, too many schemes, too much plotting, too many combinations, and all for what? To squeeze out the hard earned dollar from you and I. We must make the brain work with the muscle, and right here to-day in this society is the time to do it. I would not be understood to

say scheme to get the unlawful dollar, no, rather do without the dollar; but let us pull together for our just dues, that which honorably belongs to us. As I said before, not to get rich, but that we may make wife and children comfortable and happy. I would not find fault because the world is fast, but would devise ways and use lawful means to keep up with the world, and to improve our moral, social and financial standing in society.

We must meet often, one with another. A combination of brain force will improve our financial condition and, as I understood it, this was the object of this society when it was organized. Have we succeeded? I would say, in a manner, yes; but still there are many fruit-growers in our midst who should be lifting on the wheel to help us over hard places, but as we are few we must lift the harder. I am looking for more prosperous days in the near future.

Now a few thoughts socially. There is no denying the fact that we were created social beings. Then why is it that we have drifted so far from the original design of the Creator? Some of you, perhaps, will say we have not, but when I look back on my boyhood days I see a change. Yes, a radical change in the social condition of the world. Why, bless you, my old uncles and aunts were just as comfortably situated in point of this world's goods as you and I, and they done more visiting in one year than you and I do in ten. We know nothing of sociability as it existed fifty years ago. Let us stop and consider for a moment.

Yes, I would like to come over and see you. I should enjoy the visit. But my sewing is behind and I must get my house cleaned up a little before cold weather. When I get a little time I am coming.

- The other side—yes, just as soon as I can get things straightened up a little—fruit gathered and potatoes

W. H. U.

taken care of, then I intend to visit a little. This is what we hear on every side—first this and then that, and then I will spend a time in a social way—but unfortunately for frail humanity that time never comes, and I see no other way open but to compel ourselves to meet once or twice a year to improve the social qualities that are within us. Should I at the close of this meeting ask all present how they had enjoyed this meeting socially, all hands would come up. You sometimes read of an oasis in the desert. Here it is—an oasis of social enjoyment in the midst of a busy life. Do you love and enjoy true friendship? Do you desire to add to or increase the number of your friends? You may at this Society meet some one or more who will be a life-long friend, and perhaps a friend in time of need. Money very rarely brings with it true enjoyment, while love and friendship is the very summit of happiness; nothing in this world can compare with it. If of so much value where can it be found? Echo answers—in our Northern Colorado Horticultural Society.

DISCUSSION.

MR. McCLELLAND: I must say, I agree with the paper, and I cannot see why every fruit-grower is not a member of this or the State society.

DR. SHAW: I would like to make an announcement. I have been two months gathering up a few "object lessons" of the fruits of the State. We have a fine hall in Denver, and the annual meeting of the State Horticultural Society convenes on the thirteenth day of January, and I would like to see all here present at that meeting.

After music, the meeting took a recess until 7.30 o'clock.

The display of apples was very fine, and not only demonstrated that Northern Colorado can produce a large variety of good apples, but was a great surprise to visitors from abroad.

EVENING SESSION.

Evening session was opened promptly at the hour set, and, on account of the absence of papers next in order on the programme, PRESIDENT MILLESON presented his address. After which, by request, MR. McCLELLAND presented his paper, entitled "Utilizing and Marketing Fruits."

UTILIZING AND MARKETING FRUITS.

BY J. S. McCLELLAND.

Whether it takes more skill to grow a crop of fruit than to make the most profitable use of it afterwards is a disputed question. We know that persons who excel in both are extremely rare, and almost universally successful. There is another class who are skillful growers, whose melons rot in the field, potatoes freeze in the ground, strawberries mould before they get to market, raspberries reach town in a jelly, apples rot under the trees. We call them "unfortunate," for something or other is always wrong in getting their crops housed and marketed; but it is generally the lack of this faculty or knowledge how to best utilize their crops, and the energy and knack of doing it just at the right time. Others there are who do not succeed so well in growing vegetables and fruit but always get the best prices for what they do produce. Of the two, the latter generally makes the most money. Then there is still another class which includes, perhaps, the most of us, who grow only medium crops and are but moderately successful in

disposing of our fruits; and it is for the benefit of this large class that I will give a few hints.

The first of the season, and often one of the most difficult to properly dispose of is the strawberry. Should the berries all prove large and fine, and we have a good market, no other fruit sells so satisfactorily. We can put them up in neat new boxes and crates and dispose of them to good advantage. When, however, there comes a glut in the market, or, like last year, the berries are small and knotty, then the perplexing problem comes to the grower. What will we do with them? If we sell them to families, the ladies will turn up their pretty noses and sometimes make unkind remarks. The commission men will write, "Your berries came in bad order, badly over-ripe, small and knotty, and I had to dump them in the river; don't send any more." Or, as one wrote me last year: "Had to sell the three crates for \$1; expressage was \$1.50; commission, 10 cents." I was just out the berries, and the expense, which was: Picking at 3 cents, \$2.16; boxes and crates, 72 cents, and excess of expressage on sale, 50 cents; commission, 10 cents; the loss on the shipment amounting to \$3.48. It is true, we may can them; but canned strawberries, as paradoxical as it may seem, are difficult to either keep or dispose of, and are not at best a much-sought-after dish. We can make a few into wine for family use; but this is not a wise disposition of them, and only disposes of a few at best. They do make a desirable jam, but whether they can be thus put up and made to pay a profit to the grower we do not know. Most likely it would be found that our retail dealers would prefer handling the Eastern strawberry jellies that are said to be made out of old boots, turnips, tomatoes and the like.

In marketing the strawberry, the raspberry, and the blackberry as well, I have tried all manner and descrip-

tions of boxes, and now use only the Leslie, or oblong box. It is easier and more quickly made than any other I know of, packs in the crate nicer, and the air spaces at the corners cause the fruit to carry in better condition. I think berries look finer in these boxes than in any other, and are more easily handled. The twenty-four-box crate costs less per box than others, is of convenient size, is not too heavy to handle, and when you sell a crate you dispose of twenty-four boxes, instead of a smaller number. To those of us who sell largely to families, this is no small matter. Dealers generally prefer the twenty-four-box crate.

Raspberries are a satisfactory fruit to market, if we can keep them in good condition. It makes but little difference whether they are large or small, so far as price and ready sale go. The reds are nearly always in demand, but, at times, the blacks can scarcely be disposed of at any price. Fortunately, the latter are much better for evaporating than the former, and this is an excellent method for disposing of them. A small evaporator can be had for seven dollars, which fits on the cook stove and evaporates by steam, thus making it almost impossible to scorch the fruit. This evaporator is invaluable to the grower of black-cap raspberries for market. Berries dried in this way are very nice, and cook up in the winter or spring almost as fine as fresh fruit. Three quarts of fresh raspberries will make one pound of dried fruit, which is now quoted at twenty-five cents per pound, at wholesale, which would be eight and one-third cents per quart; rather a low price, but better than sending them to a glutted market and getting almost nothing for them, or then allowing them to go to waste. It may be well to remember these things, so, in case of very low prices, or no market for our berries, we can still profitably utilize them.

If blackberries are not sold in a fresh state I doubt if there is any profit in them—and am not very sure of the profit even then, to the grower for market. Those, however, who invested in the wonderful evergreen variety which is perfectly hardy, grows forty feet in a season and bears twenty-five quarts to the plant, may have a different result to report, perhaps; at any rate those who can sell blackberry roots at a dollar apiece should find some profit in them if none others can. To can or evaporate at the present prices and limited demand is out of the question for the large grower.

Grapes are best marketed in eight-pound baskets as soon as they ripen. There is generally ready sale for them then at good prices, but if kept later come in competition with Eastern and California fruit. Should prices drop, however, they can be carefully packed with paper between each layer of fruit and placed in a cool place and kept for months. This is better and more profitable for us than making wine of them.

The apple crop, however, is getting to be such an important one that we can not afford to neglect it. The high winds which we have in the fall blow off much fruit, and it behooves the careful orchardist to be prepared to take care of these wind-falls and not permit them to go to loss and rot on the ground. Such as are not fit for sale or use can be ground up and made into cider. It is true the quality is not the best, but it is all the better of this; for less will be drank either sweet or hard, and more will be left for vinegar, of which it makes a most excellent article. After the cider is made it should be placed in a warm situation with the bung out of the barrel or cask, and occasionally filled up that the pomace which rises to the top may work its way out. When racked off, if the liquid is allowed to drop out slowly through the air it will materially aid in hasten-

ing it into vinegar. Pure cider vinegar is always of ready sale at good prices.

When the fruit gets of sufficient size and maturity to cook well, it can be sold readily at satisfactory prices. Some varieties cook well when but half grown, such as Tetofsky, Oldenburgh and Wealthy; and the fruit grower should know his different kinds well, for there is a vast difference in the profits whether we sell these wind-falls at five or six cents per pound, make vinegar out of them, or allow them to rot under the trees. The prices of apples have been unprecedentedly low this fall, yet I doubt if they have been low enough to make evaporating them pay. Much more could have been made in turning them into vinegar. A bushel of apples of some kinds (and the Ben Davis is said to be especially valuable for evaporating purposes) will make seven and seven-tenths pounds of evaporated fruit, which at 10 cents per pound would bring 77 cents per bushel. In making vinegar it is supposed to take from eight to ten bushels to make a barrel; when this sells at even \$10 a barrel (I have been selling at 35 cents per gallon) it would give us a dollar or more for our apples.

A week or so ago the best offer I could get in Denver for my apples was \$1.50 to \$1.75 per hundred pounds delivered on the track, in sacks, in that city. The freight is 38 cents per hundred, sacks 10 cents, making 50 cents per hundred expense, by allowing two cents per hundred for placing them aboard the cars. This would allow me a cent a pound. Of course I did not sell at this figure, for if prices do not soon advance, I can turn the stock into vinegar at a much better profit. It is probable that about three dollars per hundred could be had for them now in a retail way, not selling less than a hundred pounds. The price of good fruit must soon advance.

My experience in marketing apples has been so limited that I shall attempt to give no advice, save to put them up as we do all other fruit; sort the sizes as well as we can, and, in no event, place the large and fine apples on the top and small or inferior fruit where they will not be so readily seen. It pays to be particular and honest in packing fruit of any kind. It does no more pay to put new fruit in old packages than to put new wine into old bottles. Buyers are greatly governed by the eye, and they will be attracted much more by a new and neat package than any other kind. A nice new box, a big red apple, or large smooth strawberry, will sell on sight, while a cleaner and larger box, a better flavored apple or strawberry, which are not so pleasing to the eye, will be passed by.

I have never practiced grading strawberries, it being so difficult to secure pickers who will do it properly; and handling them over after picking is so apt to injure the fruit, that, of late years, I have shipped exactly as the pickers put them in the boxes.

Strawberries are often injured by remaining in the sun after being picked; then jolting to market or the station doesn't improve them. But when roughly placed in a tight box of an express car for half a day, and then at the end of the journey thrown from the car to the transfer wagon (the twenty-four-box crates are a little too heavy generally for this base ball game), and jolted, without any protection from springs across half a dozen railroad tracks and rough streets, it is little wonder they do not present a handsome appearance when they get to the dealer. A few years ago, in shipping to Cheyenne, the berries were transferred at Greeley upon the backs of men. Reports have come to me from eye-witnesses who have seen a rough brakeman jam a crate of strawberries down on its side to spill out the fruit, and then

reach down with his dirty hands and gather up and eat the spilled berries. If these fellows had been compelled to pay for the crates of fruit they thus robbed and spoiled, there would have been less of it done in the hereafter. I have picked many crates of berries very carefully, carried them to the railroad track and placed them on the express car in the best condition, and yet when they were carried for three or four hours and reached the buyer were so jammed and battered and spilled, they presented a forlorn appearance. If this society would notify the express companies that we would hold them responsible for thus injuring and destroying our fruit, and then notify our consignees not to receive fruit so damaged, I believe there would be a change. We are compelled to pay a large enough price for this service to have it done properly and carefully.

These thoughts are more especially for the grower for market, but all who grow fruit may find something of interest to themselves, I trust.

The most important advice I have to give in utilizing and marketing fruit is reserved till the last. Utilize these choice gifts of God on your own table, see that everybody about you has plenty of them to eat, and always remember that the very best grown is not any too good for the careful and wearied grower or his family or faithful helpers.

DISCUSSION.

MR. GOSS: Thought that blackberries the most profitable crop grown.

MR. WILD: I am of the same opinion as MR. GOSS—that my blackberries are my most profitable crop.

MR. BROTHERS: I find the blackberry about the best berry for profit, and they do not require as much

care as the strawberry. The Wilson is my favorite. They averaged twelve and one-half cents last year.

Voice: How do they compare with other varieties, about laying down for winter.

MR. McCLELLAND: The Snyder is a stiff stalk to lay down; the Wilson not so bad.

MR. BROTHERS: Many dealers on Wheat Ridge are going into the Ancient Britton.

MR. ALLEN: Has any one present tried the Dew Berry?

MR. BROTHERS: I have; do not consider them a success here. I have also the Flemish Beauty and Bartlett Pears. They were very full in 1888. I have four or five kinds of plums. In 1881 I sent away and got 500 Wild Goose. They are all dead now. I have the native plums that are as fine as the Wild Goose.

MR. MILLESON: It seems MR. McCLELLAND and I cannot get along without a "tussel." If he had such plums as I have, don't think he would try Eastern kinds. I would sooner have the native; they will last about twenty years. I have a seedling of Green Gage that is very early.

MR. BROTHERS: Has MR. MILLESON had any success with cherries?

MR. MILLESON: They have been a failure with me. One crop in five years is all that can be expected.

MR. BROTHERS: I have only gotten one gallon in twenty years. Have dug up all my trees. Don't think them profitable.

MR. ALLEN: Had coaxed a cherry tree along for six years. Got about a quart this year.

After music by the choir, the Question Box was opened, and the first question propounded was, "What are the four best apples for Northern Colorado?"

MR. GIPSON: I would name as the four best, Ben Davis, Wealthy, Walbridge and Duchess.

MR. MCCLELLAND and MR. BROTHERS were of the same mind.

MR. WILD: Would substitute Pewaukee for Wealthy.

Second question—"Is the damage of the robin to be off-set by his skill as an insect-destroying bird?"

MR. OSBORN: I know of no damage they do, except to eat a few cherries.

MR. ALLEN thought they did more harm than that, among other small fruits.

DAVID BROTHERS thought them too useful to shoot.

MR. MILLESON: Had success with the robins, and took good care of them.

Third question—"What are the three best varieties of strawberries?"

MR. MCCLELLAND: Crescent and Manchester.

DAVID BROTHERS: Jucunda, Captain Jack and Manchester.

MR. OSBORNE thought MR. BROTHERS' selection good.

The choir rendered an excellent song, after which an adjournment was taken to Friday morning at 9:30 o'clock.

FRIDAY, Dec. 14, 1888, 9:30 a. m.

The morning session opened at the above hour. President in the chair.

On motion the chair appointed a committee on Resolutions and a committee on Nominations.

The programme was taken up, and MR. GIPSON called upon for his address entitled, "What the State Owes to Horticulture."

MR. GIPSON spoke without notes, going back to the early days of Colorado, and of how pioneer work had to be done in horticulture as in every thing else, and much too without the hope of direct reward; but it was a work for all and could not be estimated from or by a money value. Those who have, and are furthering the cause of horticulture should receive liberal encouragement at the hands of the State, and especially in Colorado, where so much is needed to be done to make its broad acres attractive and inviting.

The committee on nominations made the following report:

For President—JAMES ACKERMAN, Hygiene.

For Secretary—E. S. ALLEN, Loveland.

For Treasurer—S. H. DICKERSON, Longmont.

Executive Committee—C. S. FAUROT, Boulder; A. E. GIPSON, Greeley.

Vice-Presidents—W. B. OSBORN, Larimer County; W. L. PORTER, Weld County; G. A. WEBSTER, Boulder County; DAVID BROTHERS, Jefferson County; ELISHA MILLESON, Arapahoe County; which, on motion, was adopted and the officers above named duly elected.

MRS. TAYLOR was called upon for her paper entitled "The Progress of Horticulture in the Big Thompson Valley," who responded as follows:

PROGRESS OF HORTICULTURE IN THE BIG THOMPSON VALLEY.

BY MRS. WINONA W. TAYLOR.

Would that it were possible for one of us to correctly picture the very beginning of Horticulture in this fertile valley, sloping to the waters of the crystal stream; from the time that the heaving mountains became stilled, and the course of nature had prepared the soil for the growth of plant life; when the great Creator caused to grow on the rugged mountain sides the fragrant red raspberry; along the deep gulches of the foot-hills, the plump, hardy currant, black and yellow; in the rich moist valley, the purple and the yellow plum, and in the shady wet nooks, the delicate strawberry—once pronounced luscious, but now, in the light of more recent improvements, is overlooked as being too diminutive for notice.

Long before the foot of the white man trod these unknown wilds, we may imagine the shaggy bear feasting on the fruits which bountiful nature provided as a relish to his repasts of crisp, fat grasshoppers; or the ponderous buffalo tearing up in mad ecstasy the thickets richly laden with the fruit he was too heedless to note; while the snowy blossom of the strawberry was ruthlessly crushed by the sharp, quick tread of antelope and deer, and, perhaps, among them all, roamed the red man, when "His right there was none to dispute."

This, indeed, was the beginning of fruit-growing in this valley, but there came a time when its wildness

was subdued by the hand of the cultivator, and the addition of fruits and plants, not native to the soil and climate, was attempted, with the flattering results which we see to-day.

The earliest record, which I have been able to establish, of the planting of fruit trees on the banks of the Big Thompson, was in 1863, by Wm. B. Osborn, who still lives among us to enjoy the results of his later efforts; the first having proved a failure, as did also the subsequent one, in 1865, from his following the advice of the tree agents, to not water the trees in the fall so the new growth would have a chance to harden off. "And, in truth," Mr. Osborn adds, "that winter they hardened off to such an extent that they never came out of it alive."

Mr. Osborn's most successful attempt was made in 1883, and from this he now has in successful fruiting Ben Davis, Wealthy, Walbridge, Tetofsky, Sops of Wine, Jenitan, Utter's Red, Wolf River, Pewaukee and others.

The year 1867 witnessed the setting of many trees among the old settlers and a considerable number of these trees are still living and bearing. Notable among them are those set out by Frank Gard, about twelve miles east of the foot-hills, on what is known as the second bottom, a partially clay soil, and among the twenty-two varieties then set, those now standing and bearing are eleven Siberian and four Transcendent Crabs, four Red Astrachan and one White Winter Pearmain, or Pipin, which have proven hardy, and only the Red Astrachan a shy bearer.

The crabs commenced bearing in '73 or '74 and the standards in '77, ten years from the time of setting.

Firm in his faith in the fruit possibilities of our climate, and backed by the advice of his father, our ven-

erable citizen, John Brookfield Gard, who has grown old in his devotion to the apple, from Michigan to Idaho, made still more extensive plantings in 1873, which consisted of twenty-seven varieties, of what he was led to believe were suitable kinds, and among those now living, and proving his wisdom, are the Tetofsky, Red Astrachan, Red June, Duchess of Oldenburg, Talman Sweet, a Russet and another called by some Rambo and by others Pewaukee, and several others whose identity have been lost. Twelve Early York peaches were set with the first planting, but these soon found existence a burden and succumbed.

In 1876 were set Whitney's No. 20 Briar Sweet, Transcendent and a beautiful dark red crab resembling the Hyslop, but smaller and of better quality, now known in the family as the "Dollar" apple, because the original tree cost a dollar and the name has been lost. One Bartlett pear was set in 1876, which now stands, a large, handsome tree, in bearing for three or four years.

In this orchard, which of late years has had the full protection of a heavy belt of cottonwood trees, there are now about forty varieties in bearing, most of which I have already named as far as known, and as a considerable portion of them are crabs and early varieties a cider-press is kept busy in the early fall making cider and vinegar.

In '73 was established what has since come into notice as being one of the most successful orchards in this valley, set by Geo. W. Lytle on the clay uplands a mile or more from the river and embracing the varieties then considered the most promising, and now bearing abundant crops, largely of the Red Astrachan, which has here proved an abundant bearer and profitable variety.

Later, probably in '81, Mr. Lytle ordered from the brilliantly illuminated sample book of James Hogan, the reputed agent of the Lee Summit, Missouri Nursery, fifty trees each of the Ben Davis, Tetofsky, Red Astrachan, Huntsmans' Favorite and one or two other sorts which came duly to hand, a remarkably uniform handsome lot of trees, which all made a fine growth, and when the fruiting season came you could pick the old reliable Ben Davis from all of them and many of us have wondered why Mr. Lytle was so impressed with the value of the Ben Davis apple—'twas all on account of the re-lie-ability of the tree peddler. However, from this orchard, supplemented by some later additions, have been gathered from 1,500 to 2,000 bushels of fine apples this season by its present owner, Mrs. Elizabeth Quigley.

Less than a mile from the foot-hills and lying in near the same form as those commonly known as the "hog-backs," lies a gray limestone ridge, whose dry heights and whitened soil had made it look, to the early settlers, the most desolate and unpromising spot for miles around, but whose peculiarities presented unusual attractions to Judge William Slaughter, an old pioneer, who, with inherent love for horticulture, built a cosy cottage on its summit, and in 1880, ridiculed by his neighbors, but encouraged by the prospect of the extensive ditch known as the Loudon, planted fruit trees and vines on its abrupt and undulating slopes. No water reached this first planting, except that applied by the "Haul-y" water-works and administered by the indefatigable Judge and his sons by means of barrel and bucket. In 1881 the trees were moved to the ditch-bank and sparingly watered, but not till '82 were the circumstances such that had an abundance of water, but this year seven of the trees bore twenty-one barrels of large, matured Ben Davis apples. The other varieties of this planting were

Rambo, Pearmain, Maiden's Blush and Red Astrachan. Since these first were set, no apple stock has been purchased, but of the 350 trees now growing all but about twenty are seedlings raised by Mr. Slaughter from the seeds from a barrel of choice apples, and planted a year or two later. Of these, a number fruited this year and, though not grafted, some proved large and fine.

Judge Slaughter has proved the practicability of growing apples from cuttings, and has now growing in his nursery rows, slips from the Rambo and Transcendent. Some were cut direct from the tree and stuck in the ditch mud, and some stuck in a cactus; while others were layered from the water-sprouts, near the foot of the trees.

A Louise Bonne de Jersey pear tree is now growing in a thrifty condition, after a mulching of old iron; though puny and unpromising the first few years.

Hundreds of grapes—Red and White Delaware, Concord and Martha, cover a southern slope, set eight by nine feet, and in alternate rows; each way are set cherry trees as a protection to the vines from heat and hail. Small fruits abound in untold quantities, and show a thriftiness rarely seen.

The covering of the raspberries is done in a manner which is quite a relief from the earth-burying, so much deplored by Max Clark and others, by trimming back the vines to reasonable size and bending them to the ground by a pole pushed firmly by two men and held there till strongly staked and a thick mulch of light materials, leaves and straw, buries them from sight. This covering is readily removed in the spring and does not leave the troublesome mound of earth at the roots, growing yearly larger.

In 1873 Alfred Wild began the location of an orchard, just inside the foot-hills, on the fine sandy loam common to the mountain regions. Here are growing and fruiting the Ben Davis, Walbridge, Willow Twig, Genitan, Jonathan, Red Astrachan, Duchess, Snow, Hyslop and Transcendent. The Ben Davis and Jonathan proving themselves the most profitable so far, but many others have not yet fruited, but the Domine seems the least valuable. Grapes and blackberries are abundant on this place, and are covered in winter. The varieties of grapes are Martha, Concord and Hartford Prolific. Mr. Wild is preparing for future prosperity by having now growing 21,000 root grafts—5,000 of them Ben Davis, 2,000 Duchess, 2,000 Yellow Transparent, 2,000 Pewaukee and others. He is experimenting with two California Hungarian Prunes, and speaks a good word for the much abused Evergreen Blackberry.

Close to the foot-hills various orchards have been set from time to time, prominent among them being those of Horace Chadburn and P. H. Boothroyd, who show the largest home-raised Ben Davis in our market, as well Pewaukee, Alexander, Tetofsky and other choice varieties, and in only one instance does the crab prove not entirely hardy.

From the earliest attempts to the latest, at intervals of a few years, did the late Secretary of the Northern Horticultural Society, John E. Washburn, prosecute the work of setting and experimenting with fruits of nearly all kinds, and as a monument to his memory, stands now an orchard of nearly 200 trees, consisting of crabs, Ben Davis, Northern Spy, Walbridge, Red Astrachan, Willow Twig, Duchess, Wealthy, Alexander, Utter's Red and several others, and containing the largest Talman Sweet tree in this State—so says DR. SHAW, and which in the year of 1888 bore eight bafrels of perfect

fruit, also a Transcendent crab, whose drooping branches cover a space forty feet across.

There are hundreds of other fruit trees growing on the stream and on the outlying hills of our valley of which no special mention can be made at this time, but which will sooner or later help to make up the sum of evidence that we are not lacking in either faith, works nor success in the growing of fruit in this valley whose water supply comes from the foot of Long's Peak and the mighty snowy range. Of the small fruits nearly every orchard herein mentioned has its quota in several varieties, and with the exception of grapes all are extensively grown for market. Time and opportunity have not permitted me to make this paper as complete as I wish in order to give credit to the locality dear to me as my home, and whose purple mountain slopes have greeted my waking eyes for twenty-six years, and whose interests will never cease to be as my own.

DISCUSSION.

The discussion was entered into heartily by many of the "pioneers" of the "Big Thompson Valley," followed by a more general discussion of varieties of fruit mentioned in the paper.

MR. McCLELLAND: Questioned the reliability of Red Astrachan apple spoken of, as it was known to be a shy bearer.

MR. BROTHERS said in his neighborhood (Denver) the variety was prolific.

MRS. BENSON had Red Astrachans that did well.

MR. ACKERMAN: This variety is late to bear, but a good variety and a good shipper.

Question—What age of tree would you plant in Colorado orchards?

MR. ACKERMAN: A three-year-old tree is a desirable age.

Question—What are the two best crab apples for Colorado?

MR. ACKERMAN: Martha and Hyslop.

MR. MCCLELLAND: Martha and Whitney are my choice.

MR. ACKERMAN: The Bassett is an excellent variety and good for dessert.

PROF. JAMES CASSIDY was called upon for his paper on "Apple Twig Blight." [Report not found.]

DISCUSSION.

The discussion that followed the reading of this paper was of a general nature, comprising a consideration of the effect of cold on trees grown in Colorado and at a lower altitude.

The meeting then took a recess until 2 p. m.

AFTERNOON SESSION.

Meeting was called to order by the President and the "*Question Box*" opened with the following question: "What proportion of each—Summer, Fall, Early and Late Winter Standard Apples, should a farmer plant for profitable marketing?"

MR. ACKERMAN: I would not plant many summer if at a distance from market.

MR. OSBORN: I would prefer very early and long keepers, not many fall or early winter.

MR. CHAPMAN: I have a rough piece of land, on hill-side, would it be desirable for an orchard?

MR. McCLELLAND: I have always found that I could sell in our town, Fort Collins, all early kinds of apples and late kinds; no fall nor summer.

MRS. WASHBURN: The reports answer MR. CHAPMAN'S question.

MR. BROTHERS: It would depend upon the market largely as to what kind to plant. Early if close by market, otherwise if not. In answer to MR. CHAPMAN'S question I would say his rough land is suitable for an orchard.

MISS STRATTON, being present, was called upon for her paper. [Report not found.]

The Committee on Resolutions made the following report:

To the Northern Colorado Horticultural Society:

Your committee appointed to report on the death of members of this Society during the past year, viz: GEO. SAVORY, of Boulder, a former useful and zealous member of this Society, beg leave to submit the following:

Resolved, That in the death of GEO. SAVORY our Society has lost one of its best members, lending his earnest support for the advancement of its interests when an opportunity was offered.

Resolved, That this resolution be spread upon the records of this Society and a copy of the same be transmitted to the family.

Respectfully submitted,

P. D. GOSS,
J. S. McCLELLAND,
JAMES ACKERMAN,
Committee.

Committee on final resolutions beg leave to report the following:

Resolved, That this Society feel under many obligations to those that have furnished the music for this session, and that our thanks are due and are hereby tendered to MR. and MRS. PALMER, MR. and MRS. TAYLOR, MISS WOLVERTON, MR. COLE and MR. CURRIER for the excellent music with which all our session has been enlivened.

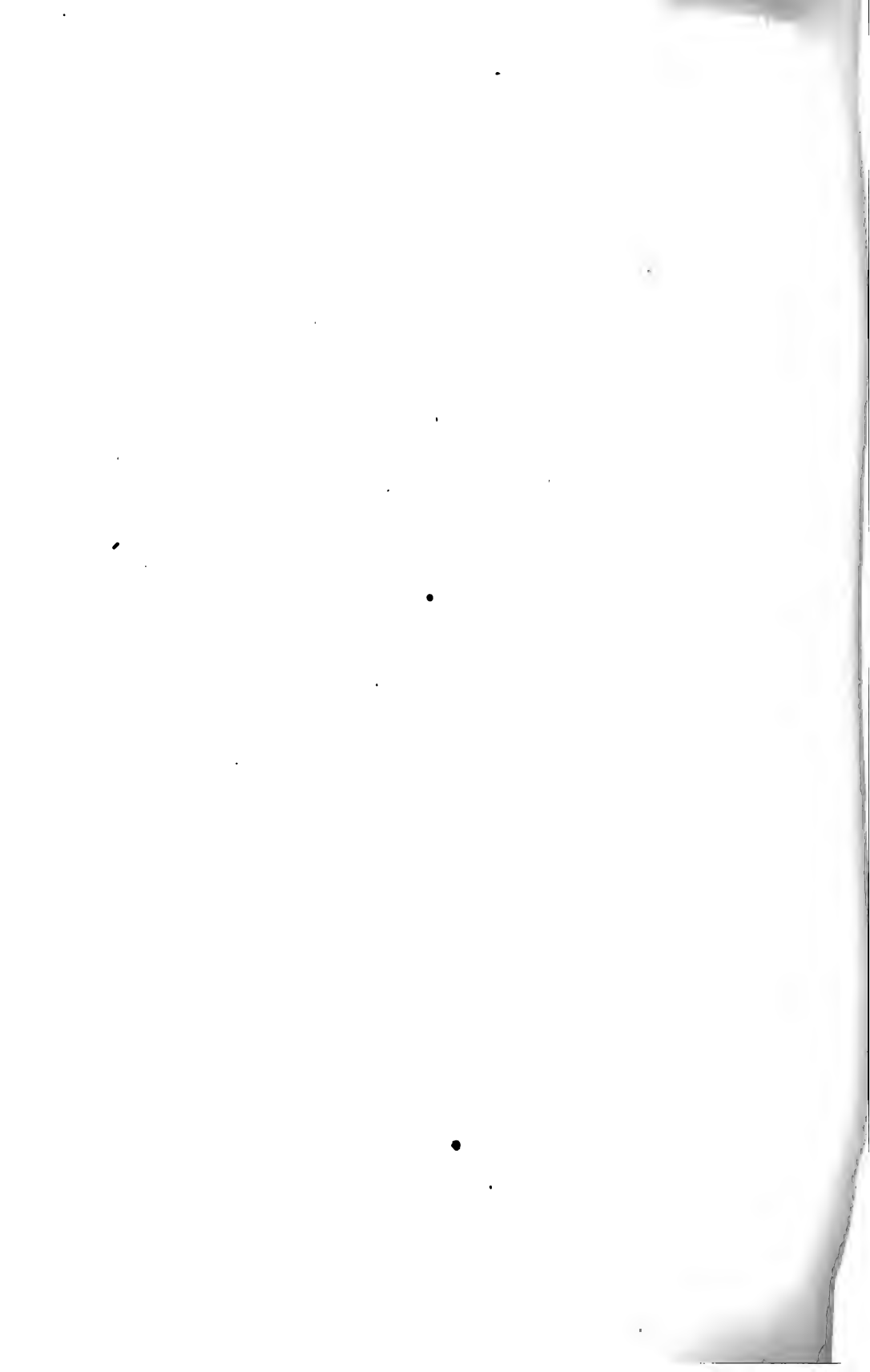
J. S. McCLELLAND,
JAMES ACKERMAN,
VOLNEY CHAPMAN,
Committee.

The next on the programme being "Culture and Management of Root Crops," by PROF. BLOUNT, was called for and read by the Professor.

[NOTE—This paper was prepared for State Horticultural Society, and will appear in the proceedings of that Society.—SECRETARY.]

Several papers upon the programme were omitted on account of the inability of those who had the subjects to treat to be in attendance, owing to sickness.

The session as a whole was very interesting and profitable one to those interested in fruit growing, and the meeting adjourned to meet at Longmont one year hence.



ANNUAL REPORT

OF THE

Colorado State Horticultural

AND

FORESTRY ASSOCIATION, 1890.

FIFTH VOLUME.

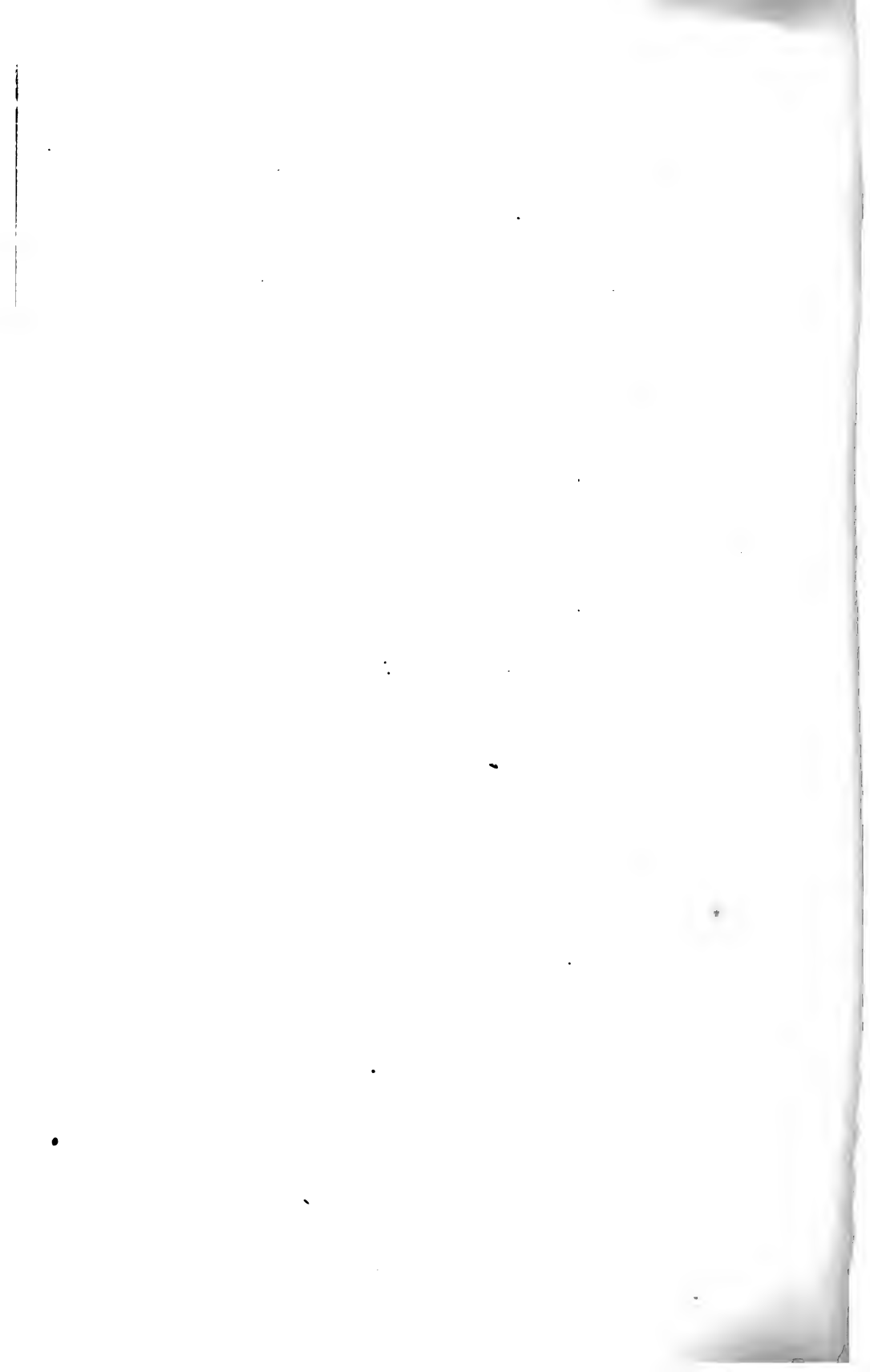
DR. ALEX. SHAW, SECRETARY.

OFFICERS FOR 1890.

| | |
|--------------------------|-------------------------|
| C. S. FAUROT | President |
| W. B. FELTON | Vice-President at large |
| WM. DAVIS | Treasurer |
| DR. ALEX. SHAW | Secretary |

EXECUTIVE COMMITTEE:

| | |
|---------------------------|----------|
| DAVID BROTHERS, | Denver |
| S. R. PRATT, | Denver |
| W. B. OSBORN. | Loveland |



DENVER, COLO, May 20, 1890.

HON. JAMES RICE,

Secretary of State, Colorado:

Sir—In compliance with law, I herewith submit the report of the Colorado State Horticultural and Forestry Association for the year 1890, with supplemental papers.

Respectfully yours, etc.,

ALEX. SHAW,

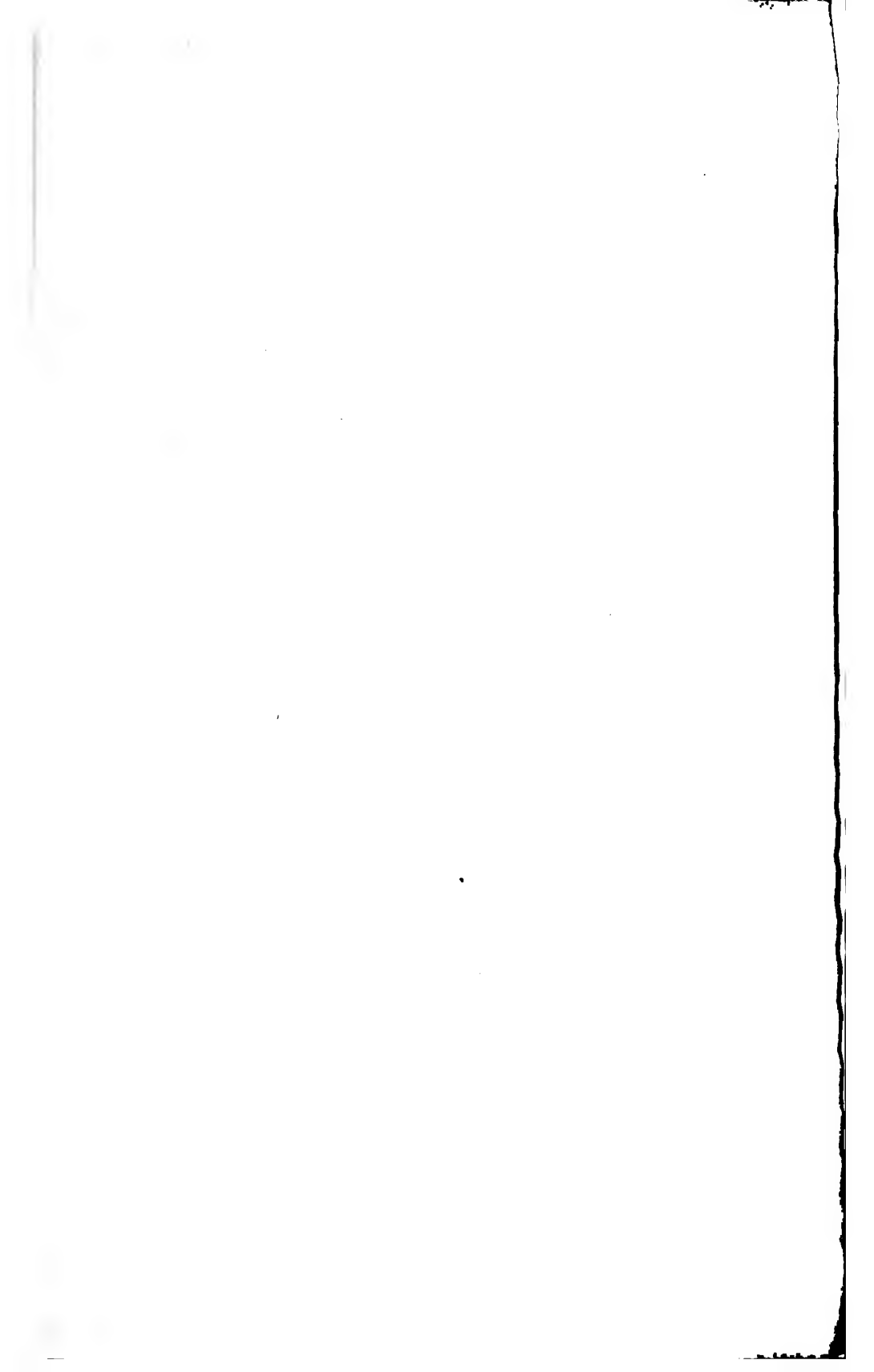
Secretary.

STATE OF COLORADO, }
SECRETARY'S OFFICE. }

Filed May 20, A. D. 1890, at 2:30 o'clock p. m.

JAMES RICE,

Secretary of State.



OFFICERS FOR 1890.

OFFICIAL ROSTER.

PRESIDENT,

C. S. FAUROT, Boulder.

VICE-PRESIDENT AT LARGE,

W. B. FELTON, Cañon City.

TREASURER,

WM. DAVIS, Fairview and Gallup Avenues, Denver.

SECRETARY,

DR. ALEX SHAW, 1318 Grant Avenue, Denver.

EXECUTIVE COMMITTEE,

DAVID BROTHERS, Denver.

S. R. PRATT, Denver.

W. B. OSBORN, Loveland.

COUNTY VICE-PRESIDENTS,

ARAPAHOE. ELISHA MILLESON. . Denver.

ARCHULETA HON. A. D. ARCHULETA Pagosa Springs.

BACA . . . JAMES E. CHURCH . . Springfield.

BENT . . . HERMAN FREY. . . . Las Animas.

BOULDER. . EDWARD S. HANSELL Boulder.

CHAFFEE. . E. G. BETTIS Buena Vista.

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CUSTER . . E. T. BECKWITH . . . Silver Cliff.

DELTA . . SAMUEL WADE Paonia.

DOLORES . FRANK R. LEWIS . . Rico.
 DOUGLAS . HARRY JONES Castle Rock.
 EAGLE . . GEO. E. BOWLAND . . Red Cliff.
 ELBERT . . LEE RAMSEY Kiowa.
 EL PASO . . F. W. HOBART Colorado Sp'gs.
 FREMONT . W. H. HARRISON . . Cañon City.
 GARFIELD . THOS. W. LENARD . Glenwood Sp'gs.
 GILPIN . . SAMUEL T. NEWEL . Central City.
 GRAND . . ED. J. JONES Hot Sulphur Sp'gs.
 GUNNISON . ALEX. GUELETT . . Gunnison.
 HINSDALE . GEORGE F. FRY . . . Lake City.
 HUERFANO. JOHN D. MONTEZ . . Walsenburg.
 JEFFERSON. AL. TOWNSEND . . . Golden.
 KIOWA . . W. L. LAFFERTY . . . Sheridan Lake.
 KIT CARSON. DAN'L CAVANAUGH. Burlington.
 LAKE . . . EDWARD DALE Leadville.
 LA PLATA . GEORGE WEAVER . . Durango.
 LARIMER . J. T. BUDROW Fort Collins.
 LAS ANIMAS. S. DE BUSK. Trinidad.
 LINCOLN . A. L. LADUE Hugo.
 LOGAN . . CHARLES S. LAKE . . Sterling.
 MESA . . . ROBERT ORR Grand Junction.
 MONTEZUMA FRANK HUMBLE . . . Cortes.
 MONTROSE. JUDGE BELL Montrose.
 MORGAN . . T. D. HEISKEL Fort Morgan.
 OTERO . . . J. E. GUAGER La Junta.
 OURAY . . M. A. CUTTER Ouray.
 PARK . . . A. E. VANDUSEN . . Fairplay.
 PHILLIPS . CHAS. E. McPHERSON Holyoke.
 PITKIN . . J. W. CHATFIELD . . Aspen.
 PROWERS . MR. COOPER Lamar.
 PUEBLO . . THOS. THOMPSON . . Pueblo.
 RIO BLANCA L. B. WALBRIDGE . . Meeker.
 RIO GRANDE R. C. NESBIT Del Norte.
 ROUTT . . . C. E. BAKER Hahn's Peak.
 SAGUACHE . CHARLES D. JONES . Saguache.

SAN JUAN . M. W. EMERY Silverton.
 SAN MIGUEL CHAS. L. WATSON Telluride.
 SEDGWICK . DAVID B. MORGAN Julesburg.
 SUMMIT . . W. F. FORMAN Breckenridge.
 WASHINGTON W. H. SEARMAN Akron.
 WELD . . . A. E. GIPSON Greeley.
 YUMA . . . FRANK W. WILLIAMS Yuma.

STANDING COMMITTEES, 1890.

ENTOMOLOGY AND BOTANY.

PROF. JAMES CASSIDA Fort Collins.

ORNAMENTAL GARDENING.

JOHN BERRY Denver.

VEGETABLE CULTURE.

W. W. WILMORE, Jefferson Co. Denver.

W. L. PORTER Greeley.

J. L. IBBISON Denver.

POMOLOGY.

JAMES ACKERMAN Hygene.

DALL DEWEESE Cañon City.

SAMUEL WADE Paonia.

FORESTRY.

D. S. GRIMES Denver.

COL. EDGAR T. ENSIGN Colorado Springs.

GEOLOGY.

PROF. LAKE Golden.

IRRIGATION.

PROF. L. G. CARPENTER Fort Collins.

EDWARD EASLEY Golden.

ORNITHOLOGY.

A. T. ALLEN Denver.

ANNUAL MEMBERS, 1890.

| | |
|-------------------------------|---------------|
| James Ackerman | P. O., Hygene |
| Levi Booth | Denver |
| Mrs. M. A. Booth | Denver |
| E. Easley | Golden |
| D. M. Easley | Golden |
| J. S. Iberson | Denver |
| Mrs. Iberson | Denver |
| Mrs. H. P. Merrill | Denver |
| Elisha Milleson | Denver |
| Milton Milleson | Denver |
| Jane Milleson | Denver |
| A. E. Gipson | Greeley |
| E. T. Hubbard | Alamosa |
| S. A. Osborn | Denver |
| David Brothers | Denver |
| Mrs. David Brothers | Denver |
| T. H. Kellogg | Denver |
| C. S. Fautot | Boulder |
| J. B. Bowman | Pueblo |
| Jacob Haver | Pueblo |
| John Tobias | Denver |
| Allen Lewis | Golden |
| W. W. Wilmore | Denver |
| C. H. Hughes | Denver |
| W. E. Pabor | Fruita |
| E. P. Horne | Argo |
| J. W. Rose | Argo |
| W. B. Felton | Cañon City |
| S. Allen Long | Denver |
| Mrs. Allen Long | Denver |
| D. S. Harris | Burlington |

| | |
|-------------------------------|------------------|
| J. H. Bramuner | Burlington |
| J. S. Parsons | Colorado Springs |
| L. J. Peabody | Denver |
| Paul Anderson | La Jara |
| A. J. Vanderin | Denver |
| Mr. Wadsworth | Denver |
| Ed. S. Howsel | Boulder |
| Robert Stephens | Longmont |
| Eugene Wilder | Boulder |
| Ed. S. Walker | Boulder |
| C. A. Clark | Lewisville |
| John Brierley | Boulder |
| Mrs. B. M. Williams | Boulder |
| Peter Lyner | Canfield |
| Mrs. J. W. Andrews | Boulder |
| Mrs. H. C. Barker | Boulder |
| E. T. Carr | Boulder |
| C. S. Land | Montrose |
| Thomas Wells | Cañon City |
| W. C. Catlin | Cañon City |
| W. S. Coborn | Paonia |
| Wm. B. Upton | Montrose |
| J. H. Harrison | Cañon City |
| A. D. Cooper | Cañon City |
| Thomas Prescott | Cañon City |
| Mrs. A. R. Toof | Beaver Station |
| W. A. Stump | Cañon City |
| J. B. White | Cañon City |
| John Pierce | Beaver Station |
| John Gravestock | Cañon City |
| S. De Busk | Trinidad |
| George Westlake | Denver |
| R. N. Orange White | Florence |
| Wm. Barker | Witmore |
| Thomas Ripley | Cañon City |
| C. W. Fulason | Oxford |

LIFE MEMBERS.

| NAME. | POST-OFFICE ADDRESS. |
|---------------------------------|--------------------------------|
| Berry, John | Denver |
| Ball, J. J. T | Denver |
| Brown, H. C | Denver |
| Bird, F. E | Denver |
| Braun, G. J | Denver |
| Crawford, R. T | Colorado Springs |
| Corning, Geo. C | Denver |
| City National Bank | Denver |
| Craig, Rev. W. B | Denver |
| Craig, Mrs. W. B | Denver |
| Clark, J. M | Denver |
| DeVinney, V | Jefferson County, P. O. Denver |
| Davis, William | Denver |
| Ellsworth, L. C. | Denver |
| Frazier, Jesse | Florence, Fremont County |
| Grimes, David S. | Denver |
| Gallup, Avery. | Denver |
| Gallup, C. R | Denver |
| Hanna, J. R | Denver |
| Hallack, Mrs. Charles | Denver |
| James, Robert | Denver |
| Kountz, C. B. | Denver |
| Lane, John H. | Denver |
| Lee, Henry | Jefferson County, P. O. Denver |
| Lessig, W. H. | Denver |
| Londoner, Wolfe | Denver |
| Lower, John P | Denver |
| McClure, Mrs. Kate B. | Denver |
| Moore, Rev. D. H. | Denver |
| Marquis, Robert | Denver |
| Moulton, Thomas | Denver |

| NAME. | POST-OFFICE ADDRESS. |
|-------------------------------|-----------------------------|
| Newcomb, J. H. | Denver |
| Newcomb, Mrs. J. H. | Denver |
| Peabody, A. L. | Grand Junction, Mesa County |
| Peabody, Mrs. A. L. | Grand Junction, Mesa County |
| Pitkin, Ex-Gov. F. W. | Pueblo |
| Pierce, Gen. John | Denver |
| Rushmore, H. | Denver |
| Richardson, Geo. | Argo |
| Shaw, Dr. Alex. | Denver |
| Short, Prof. S. H. | Denver |
| Van Camp, J. M. | Denver |
| Wolf, H. G. | Denver |
| Wolf, Mrs. H. G. | Denver |
| Wood, S. N. | Denver |
| Wolcott, E. O. | Denver |
| Wade, Samuel. | Paonia |
| Dana, F. A. | Denver |
| Dall Deweese | Cañon City |
| S. R. Prat | Denver |

HONORARY MEMBER.

Brackett, G. C., Sec. Kansas State Horticultural Society.

EXECUTIVE COMMITTEE MEETINGS.

DENVER, January 29, 1889.

Executive Committee met for the purpose of auditing bills. Present, LEVI BOOTH, DAVID BROTHERS and ALEX SHAW. LEVI BOOTH in the chair.

Secretary's statement of receipts and expenditures as stated in annual report, 1888, was approved.

The following bills were audited and allowed, and Secretary directed to pay from any funds in his hands as receipts of membership fees:

| | |
|--|----------------|
| Miss Grace Patton, for reporting proceedings of annual meeting, 1889 | \$25 35 |
| Mr. Tuffman, expressman | 2 00 |
| Rocky Mountain News Co., letter heads and envel- opes, warrant No. 46 | 5 75 |
| Chain & Hardy. | 90 |
| Total | <u>\$34 00</u> |

Adjourned.

SECRETARY'S OFFICE, April 8, 1889.

Executive Committee met on written notice by Secretary.

PRESIDENT C. S. FAUROT, in the chair.

Present: C. S. FAUROT, DAVID BROTHERS, JOHN TOBIAS and ALEX. SHAW.

Minutes of last meeting read and approved.

The following bills were audited and allowed.

The Treasurer having received the \$1,000 appropriated by the Legislature for the relief of the Association, the Secretary was directed to draw warrants on the Treasurer for the respective amounts:

| | |
|--|----------|
| J. M. Clark, Association note held by him for services rendered as Secretary \$150, and interest on same \$35.70; total, warrant No. 4 . . . | \$185 70 |
| Nelson Millet, for services as Secretary for 1886 and 1887, warrant No. 2 | 300 00 |
| Alex. Shaw, for services as Secretary, 1888, warrant No. 1 | 400 00 |
| C. S. Faurot, cash advanced for printing letter heads, warrant No. 3 | 5 00 |

On motion, a summer meeting and exhibition of the Association was ordered to be held at Boulder, time to be definitely fixed at a subsequent meeting.

Adjourned to meet at headquarters Monday 15th inst.

DENVER, April 15, 1889.

Executive Committee met pursuant to adjournment. Present, C. S. FAUROT, DAVID BROTHERS, JOHN TOBIAS, ALEX. SHAW and WM. DAVIS.

On motion of DAVID BROTHERS, it was ordered that the sum of \$2.50 per day and traveling expenses, also hotel bill, be paid to each member of the Executive Committee for each day's attendance upon regular and called meetings of said committee.

On motion, the following persons were appointed on standing committees for the year 1889:

Botany and Entomology—Prof. James Cassiday, Fort Collins.

Ornamental Gardening—John Berry, Denver.

Vegetable Culture—W. W. Wilmore, Denver; W. L. Porter, Greeley; J. S. Ibbison, Denver.

Pomology—James Ackerman, Hygiene; Dall De-weese, Cañon City; Hon. Samuel Wade, Paonia.

Forestry—Col. Edgar T. Ensign, Colorado Springs; D. S. Grimes, Denver.

Geology—Prof. Lake, Golden.

Irrigation—Prof. Carpenter, Fort Collins; Edward Easley, Golden.

Ornithology—A. T. Allen, Denver.

On motion, the Secretary was directed to perfect a list of vice-presidents for each county in the State.

On motion, the President and Secretary were constituted a committee to fix the time and arrange premium list and programme for the summer exhibition at Boulder. The time was fixed for June 19 and 20, and \$100.00 was appropriated to pay premiums at said exhibition.

On motion of John Tobias, an appropriation of \$25.00 was made for incidental expenses of Secretary's office, and warrant No. 5 for said sum was drawn.

Adjourned to meet on notice of Secretary.

DENVER, COLO, May 20, 1889.

Executive Committee met on written notice by Secretary.

Present, C. S. FAUROT, W. B. FELTON, JOHN TOBIAS, DAVID BROTHERS and ALEX. SHAW.

Minutes of last meeting read and approved.

The following additional vice-presidents were appointed:

Archuleta county, Hon. A. D. Archuleta; Custer county, E. T. Beckwith; Gilpin county, Samuel T. Newell; Gunnison county, Alex. Guelett; Huerfano county, John D. Montez; Ouray county, M. A. Cutter; Pitkin county, J. W. Chatfield; Prowers county, Mr. Cooper.

The manuscript, as prepared by Secretary, of the report of doings of the Association for 1888, was revised and approved; also the report of the Northern District Horticultural Society, and Secretary was ordered to file them with Secretary of State as required by law for publication.

The following accounts were allowed and warrants directed to be drawn on Treasurer for same, in favor of members of Executive Board for services rendered: .

| | |
|---|---------|
| C. S. Faurot, meeting April 12, one day . . . | \$ 2 50 |
| Hotel and railroad fare | 4 10 |
| May 20, per diem | 2 50 |
| May 20, railroad fare | 1 45 |
| Paid by warrant No. 6 | \$10 55 |
| David Brothers, April 10, per diem. | \$2 50 |
| Hotel | 50 |
| May 20, per diem. | 2 50 |
| May 20, hotel. | 50 |
| Paid by warrant No. 7. | \$ 6 00 |
| John Tobias, April 12, per diem | \$ 2 50 |
| Hotel | 50 |
| May 20, per diem. | 2 50 |
| Hotel | 50 |
| Paid by warrant No. 8. | \$ 6 00 |
| Wm. Davis, per diem, April 10 | \$ 2 50 |
| W. B. Felton, per diem, May 20 | \$ 2 50 |
| Hotel and railroad fare | 8 50 |
| Paid by warrant No. 10 | \$11 00 |

On motion of W. B. FELTON, Secretary SHAW's salary was fixed at \$500 for the year 1889.

Miss Grace Patton's bill for \$30 for typewriting papers read at annual meeting in January, was presented, and Secretary was directed to pay it out of amount allowed him as salary.

Adjourned to meet at Boulder, June 19.

BOULDER, COLO., June 19.

Association met pursuant to notice given by committee of arrangements, as follows:

President C. S. FAUROT in the chair.

JUNE MEETING,

1889,

COLORADO STATE HORTICULTURAL AND FORESTRY ASS'N,

AT

BOULDER, COLORADO.

FLORAL, STRAWBERRY, SUMMER FRUITS AND VEGETABLE EXHIBITION, TWO DAYS AT COUNTY COURT ROOM,
JUNE 19 AND 20.

Liberal Premiums Endorsed and Guaranteed by Association; Competition Open to All; Day and Evening Entertainments; Good Music during Exhibition Hours; Room Brilliantly Lighted by Electric Lights; Awards Made According to following Classification.

NOTE—Ship all samples for exhibition within the State of Colorado by express to C. S. Faurot, Pres. Colorado State Horticultural and Forestry Ass'n, Boulder, Colo.

Essays and topics germane to Horticulture will be read and discussed.
Those desirous of learning details of meeting can address

ALEX. SHAW,

Secretary, 1318 Grant ave., Denver, Colo.

C. S. FAUROT,

President, Boulder, Colo.

FLORAL DEPARTMENT, NO. 1.

| | | |
|---------|---|---------|
| No. 1. | Largest and best show of Greenhouse Plants, not less than fifty | \$12 00 |
| | The Brown Mercantile Company, Boulder, will give as a special premium one water set valued at \$5 00. | |
| No. 2. | Second best | 3 00 |
| | J. J. Rutter & Son, Boulder, will give as a special premium one carving set, valued at \$3.50. | |
| No. 3. | Best collection of Cut Roses | 3 00 |
| No. 4. | Best show of Geraniums in bloom | 2 00 |
| No. 5. | Best show of Foliage Geraniums | 2 00 |
| No. 6. | Best show of Cut Pansies | 1 00 |
| No. 7. | Best and largest variety of Cut Annuals | 1 00 |
| No. 8. | Best and largest show of Cut Perennials | 1 00 |
| No. 9. | Best collection of Climbing Plants | 2 00 |
| No. 10. | Best collection of Fuschias | 2 00 |
| No. 11. | Single Fuschia | 1 00 |
| No. 12. | Best collection of Palms | 3 00 |
| No. 13. | Best collection of Ferns | 3 00 |
| No. 14. | Best collection of Hand Boquets | 3 00 |
| No. 15. | Best show of Floral Designs | 10 00 |
| No. 16. | Best show of Hanging Baskets filled with Plants | 3 00 |
| No. 17. | Best show of Rustic Stands filled with Plants | 2 00 |

FRUIT DEPARTMENT, NO. 2.

STRAWBERRIES.

| | | |
|--------|---|---------|
| No. 1. | Best and largest collection of Strawberries, not less than one quart, each variety. | \$10 00 |
| No. 2. | Second best | 5 00 |
| No. 3. | Best single variety | 2 00 |
| No. 4. | Best six varieties, not less than one quart | 3 00 |
| | Special premium by Lockwood Trading Co., Boulder, hanging lamp, value \$5.00. | |
| No. 5. | Best twelve specimens of any variety | |
| | Hafner & Hafner, Boulder, special premium, rocking chair, value \$5.00. | |
| No. 6. | Best six Plants in Pots, with berries attached | |
| | Hawkins, Heskey & Johnson, Boulder, special China milk set, value \$5.00. | |

CURRANTS.

- No. 7. Best show of Currants \$ 2 00

GOOSEBERRIES.

- No. 8. Best show of Gooseberries of any variety \$ 1 00

RASPBERRIES.

- No. 9. Best show of Raspberries of any variety \$ 2 00

CHERRIES.

- No. 10. Best show of Cherries of any variety \$ 2 00

VEGETABLE DEPARTMENT, NO. 3.

- No. 1. Best and largest collection of Kitchen Garden Vegetables \$ 5 00
Bradley Wise Mercantile Co., of Boulder, special premium of dress pattern, value \$10.00.
Second premium, \$2.00 and one copy, one year, *Local Miner*.
- No. 2. Best six heads Early Cabbage 2 00
Second premium, Bliss & Holbrook, Boulder, special premium, tea, value \$1.00, and one copy, six months, *Boulder News and Courier*, value \$1.00, by L. L. Gray.
- No. 3. Best six Early Beets
Special by Jeffries & Co., tea, value \$1.00; by L. L. Gray, one copy, six months, *Boulder News and Courier*, value \$1.00.
Second premium, *Boulder Sentinel*, by editor, value \$1.00.
- No. 4. Best twelve Turnips
Special by J. L. Rafschafsky, Boulder, one table spread, value \$5.00.
Second premium, one copy *Boulder Herald*, one year, value \$2.00.
- No. 5. Best six heads Lettuce
Tea, by George Holstine, Boulder, value \$1.00.
Second premium, six months, *Boulder News and Courier*, value \$1.00.
- No. 6. Best six bunches Radishes 1 00
One copy *Herald*, one year, value \$2.00.

HORTICULTURAL AND FORESTRY ASSOCIATION. 321

| | | |
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| No. 7. | Best four quarts Peas | |
| | Special, washing machine, value \$8.50. | |
| | Second premium, one copy <i>Boulder Herald</i> , one year, value \$2.00. | |
| No. 8. | Best four quarts Beans | 1 00 |
| | Six months, <i>Boulder News and Courier</i> , value \$1.00. | |
| | Second premium, one copy <i>Boulder Herald</i> , one year, value \$2.00. | |
| No. 9. | Best six Cucumbers | 1 00 |
| | One copy <i>Local Miner</i> , one year, value \$1.00. | |
| | Second premium, six months <i>News and Courier</i> , value \$1.00. | |
| No. 10. | Six bunches Onions | 1 00 |
| | Second best, one copy of <i>Herald</i> , value \$2.00. | |
| No. 11. | Best six Egg Plants | 1 00 |
| | Second best, one copy <i>Boulder Sentinel</i> , one year, value \$1.00. | |
| No. 12. | Best Summer Squash | 1 00 |
| | Second best, six months <i>Boulder News and Courier</i> . | |

BOULDER, COLO., June 19, 1889.

On motion of DR. SHAW, a committee of three was appointed by the chair to have under consideration the matter of holding a fall meeting of the Horticultural Association in the southern part of the State.

The committee appointed consisted of Messrs. Felton, of Cañon City, Ackerman, of Hygene, and Brothers, of Wheat Ridge.

The President then read the following list of committees:

Floral—Prof. Cassidy, Fort Collins; George Walker, Boulder, and W. B. Felton, Cañon City.

Fruit—James Ackerman, Hygene; D. S. Grimes, Denver, and Prof. Rule, Boulder.

Vegetables—David Brothers, Wheat Ridge; Robert Stevens, Longmont; J. M. Smith, Boulder.

Resolutions—A. E. Gipson, Greeley; James Ackerman, Hygiene; Judge Felton, Cañon City.

On motion of Dr. SHAW, Judge Felton made a five minutes speech on the fruit outlook of his section.

Judge FELTON said: We never had such good prospects in the way of trees, fruits, etc., as this season; the trees are loaded with fruit; our strawberry crop is nearly twice as large as usual; the cherry and raspberry crops are much better than ever before; the same may be said of the blackberry crop; the peach trees are full of peaches; plums and apricots are doing well; the apple trees, of all varieties, are laden with fruit; the pear trees are as full as they ought to be; we will have a chance to try pears this year that have never borne before in the State.

DR. SHAW: What are some of the varieties of pears that are going to bear this year that never did before?

JUDGE FELTON: I have the Bartlett, Osbond's, Summer, Sheldon, Buerre de Anjou, Seckel, Vicar of Wakefield, and the most of these have never been known to bear in the county, but will bear this year.

PRESIDENT FAURÔT: We would like to hear from Mr. ACKERMANN, as he represents the apple district of Boulder County.

MR. ACKERMANN: I have been about but little over the county, so that I can speak only from my own and neighbors' experience. Our apple crop will not exceed two-thirds what it did last year. Some of the early varieties, as Sops of Wine, etc., have very little, if any, fruit on them. The Fall varieties, as Saxton, etc., are quite full. The Ben Davis is about one-third full. I understand that Mr. STEVENS has a few varieties that are as full as last year, as Maiden Blush, but I think that in the northern part of Boulder County we can look for

only a two-thirds crop. Pears are nearly a full crop, not as full as last year, however. Plums not quite as good as last year. Cherries are a full crop all over the county. Peaches are doing well. I have two peach trees, and will have some peaches this year. Small fruits are looking well, with the exception of currants and gooseberries. We will have a full crop.

DR. SHAW suggested that MR. BROTHERS give the prospects of fruit at Wheat Ridge.

MR. BROTHERS said: I cut out the most of my peach and cherry trees last winter. I never saw a better prospect for fruit than this year on the Ridge. Small fruits are good. Strawberries in some places not so good, and in other places very good indeed. Raspberries, etc., will be a very full crop. Plums, cherries and pears are all a full crop. I never saw fruit of every kind so good as this year on the Ridge, and we are expecting a big crop of almost everything. The apple crop is going to be as large as last year, but the old trees, like Ben Davis, that bore heavily last year are not so full this year.

PRESIDENT FAUROT: We can grow strawberries here (Boulder), but the elements turned loose the other day and spoiled our strawberries, even for market. Had it not been for this we would have had a much larger display of strawberries than we have.

DR. SHAW: I have a weakness for flowers, and I can say to you that it is a pleasure to me to see such a fine display as is presented by the greenhouses of Boulder. You have as healthy a stock of flowers as can be found anywhere. We have made a special effort to display a collection of roses.

PRESIDENT FAUROT said that the subject of roses would be brought up for discussion at 2 p. m. June 20.

MR. GRIMES said: "When we look over the State of Colorado and see so much fine fruit, it looks to me as though we ought to be encouraged, but when we look at the small crop of horticulturists at our meetings, it seems to me we ought to do something to get a larger number at our meetings; I don't see why people don't take more interest in such things."

MR. JAMES ACKERMANN, of Hygiene, read a paper on the subject of "Fruits Valuable for the Farm." The paper was as follows:

FRUITS VALUABLE FOR THE FARM.

In treating upon this subject I will confine myself to what, in my judgment, every farmer can afford to do, and what no farmer can afford to do without, even from a financial standpoint. But still we should take into consideration the convenience, comfort and pleasure that it would naturally bring to the family. In the first place, I would measure off one acre of good, well tilled land, easy of irrigation, and put a fence around it so strong and so high that nothing in the way of stock could get through or over it; in that inclosure I would commence with the apple, the standard of all fruits, say five early summer, five early fall, ten late fall and thirty winter, making in all fifty apple trees, which, in five years would bring you a few apples and in ten years would give you a yield of five bushels to the tree, making 250 bushels of apples. I am trying to make this estimate very low; mine have done even better than that, nearly one half. Next in order would be the pear; say ten, about three varieties; in ten years you will get a few, a half bushel to the tree, but when once in full bearing they are more prolific than the apple and, with

me, just as hardy. But right here let us call a halt. There seems to be even amongst old men and middle-aged men that spirit of impatience—which is so predominant in young Jonathan—"well, if I must wait ten years for a return from my investment I will not invest, and that is what we call business." A leaf from my own personal experience; for nearly fifty years it has been a constant toil from year to year, ever waiting and hoping for the better, sometimes up, sometimes down, but ever hopeful; should we find fault with our Father because he did not provide us with the means to live in indolence and luxury? No, verily, the edict has gone forth, "thou shalt labor." With this little digression I will proceed with my subject. Next in order comes the plum, say about ten in three varieties, set alternately, that they may fertilize each other. I omit the cherry as the returns will not pay for the outlay in care, but still set a few every year and occasionally get a crop, which I have this year, but from a financial standpoint I am obliged to omit them. Next the currant, say twenty-four in three varieties, which would be an abundance for a large family, as I have picked as high as twenty-two quarts from one bush. Next gooseberries, ten. Strawberries, two hundred. Grapes, twenty, in four varieties. I would add, say four Russian mulberries and ten Sarvis berries to complete the list. In all ten varieties of fruit, all of which would go on one acre of land, and by drying and canning in years of plenty would give a constant supply; if you think best take two years, or even three, but be sure to take the same care of them that you would of the greenbacks that you pay out for them; remember that neglect never brings fruit. And now let us estimate the cost:

| | |
|--|----------|
| 50 apple trees, at 30 cents | \$ 15 00 |
| 10 pear trees, at 40 cents | 4 00 |
| 10 plum trees, at 40 cents | 4 00 |
| 24 currants, at 10 cents | 2 40 |
| 10 gooseberries, at 10 cents | 1 00 |
| 50 raspberries, not in list, 3 cents | 1 50 |
| 200 strawberries, 50 cents per 100 | 1 00 |
| 20 grapes, at 10 cents | 2 00 |
| 4 Russian mulberries, at 10 cents | 40 |
| 10 sarvis berries, at 10 cents | 1 00 |
| Making in all | \$ 32 30 |

The first thing I hear: "I can't afford it." Just hold on, and let us see whether you can or not; fine carriages and harness are getting to be quite common among farmers, and it is all right; now the interest on this bill of fruit would be \$3.25; can I dispense with something that would pay this interest? Let me see; one fine buggy whip at two dollars, that would pay more than one-half of it, and a cottonwood sprout would answer the same purpose; well, yes, I will get along without a few of these extras for a few years and have the fruit. Another fallacy: It has got to be the prevalent opinion among farmers that it is only the merchants, bankers, doctors and lawyers that can afford such luxury as fruit all the year; do you know that almost every time you go to town your wife says to you, "get me some dried apples, peaches or prunes, or a few cans of tomatoes or peaches?" Now how is it that the merchant's family can afford the nice things? Because you pay him from thirty to forty per cent. profit for your dried and canned fruits which you could raise for yourself. Then, again, if your family had all the nice ripe fresh fruit they could use; well, what then? Why, you would cheat your family doctor out of, let me see, at least the interest on your bill of fruit trees, \$3.25. Well, what next? Suppose you have a family of boys, and you have no fruit, they might trespass on some one else's acre. What

then? Why, the lawyer would get his share. No more excuses, but begin now; you can have currants, gooseberries, raspberries, strawberries and grapes in two years, apples in four years, pears in five years. In a large family I have not expended twelve dollars in the last twelve years. If I have named all the fruits as fruits for the farm, why not as well have a variety, as one will do as well as the other?

Do not neglect the flowers; we all like them; it is an inherent principle implanted in humanity to love the beautiful; is it worth anything to you to see the wife and children smiling and happy? Does not your wife work as hard as you? Is she not as deserving as the wife of the merchant, lawyer or doctor? Then why not make a little effort for the pleasure and comfort of the wife and children? You say I do not neglect my family. Admitted; but do you do your whole duty to your family, your community and the country, if you neglect to make home what it should be, pleasant, beautiful and attractive?

In conclusion; the labor in the production of your fruit would not necessarily increase in proportion to the income, as in a few years it would require from eight to ten acres of wheat, oats or corn to produce the same money value as from your fruit acre.

Let me ask a question: What is the great aim of life? Happiness. Are we to wait for it until we are old and worn out, or shall we plant an acre of fruit and enjoy it as we go along?

Let us use them, realizing that they are bestowed upon us by a kind providence for our comfort and happiness.

DISCUSSION.

DR. SHAW: Have you found a man who has made a failure of fruit growing in Colorado that has carried out the requirements?

MR. ACKERMAN: No, sir.

MR. BROTHERS: Why did you leave out blackberries?

MR. ACKERMAN: I have been trying blackberries for years and have none yet.

MR. BROTHERS: I think it is easier to grow blackberries than strawberries. I have 3,000 growing well, and I think blackberries ought to be put in MR. ACKERMAN'S list of fruits.

MR. ACKERMAN: Anything can go in that list that will grow in Colorado.

The following paper entitled "Suggestions on Fruit Growing," was read by A. E. GIPSON, of Greeley:

SUGGESTIONS ON FRUIT GROWING.

Assuming that one has any good average soil to start with, the first essential to best results in fruit growing is right varieties. What are the best varieties will depend on the kind of market one is to supply, and, in a measure also, on local conditions. Some fruits are excellent in quality and good yielders, but are only suitable for near market. Others may be lacking in quality but all that could be desired in productiveness and keeping points. Again, certain varieties are known to be specially adapted to particular soils and consequently profitable with right surroundings, but indifferently without such favored conditions. So if one has to deal

with any of these exceptional cases, they should be understood in advance. Otherwise it is best to cultivate only what are known as the "general purpose" fruits. Indeed, a very safe rule to follow, is to select only the leading, well-tested sorts, and further to limit the culture to a very few of the best of these. If one is to grow fruits exclusively, then he should plant with a view to a proper succession in the season. This means the early, medium and late. My experience is that the fruit-grower who can be relied on to furnish to his patrons all the fruits in his line in their right season, is the one who, all things being equal, will hold the trade. In other words, if one makes a specialty, for example, of the strawberry, let him or her plant with a view of supplying, not only the early market, but also of prolonging the season, at least so far as is consistent with a judicious selection of varieties.

Culture is the next important step towards the improvement of fruits for market. This means not only a suitable soil, but careful planting and thorough and timely cultivation.

The claim is not made that everything that is well planted will succeed, but it can be stated with confidence that the time spent in putting stock into the ground in a shiftless way, and in slovenly after treatment, is about the same as wasted.

Nature may be cheated, but she can never be deceived. We may safely stick a pin in this proposition. Whatever is to be grown either for market, home use, or for ornamentation should be set in ground that has been thoroughly prepared, and the roots should be given ample room as well as ample protection. I include in this term "ample protection" putting the roots well down into the soil.

If the soil is not naturally rich and mellow it should be made so. Plant food must be supplied, if not present, or the fruits will certainly partake of this poverty.

Some crops need almost continuous cultivation, and in fact, the maxim "cultivate often and well" is one that will admit of very general application. Keep down the weeds and keep the soil loose and mellow, and good results are pretty certain to follow. Irrigation will be needed in proportion to the character of the soil, its preparation and cultivation and the kind of crops to be grown. The determination of this must rest largely with the judgment of the individual. It is sometimes a nice point to decide just when moisture is needed, but experience will enable an observing person to judge pretty well. In any event, the right development of fruit will often depend on whether water has or has not been judiciously applied.

The plow and cultivator are most effective conservers of moisture, and soil that is kept stirred and mellowed is the one that most readily diffuses moisture.

As too strong a wood growth is always at the expense of the fruit product, proper pruning, pinching back and healing in should be practiced.

Two other problems will enter into the market problem. One is the gathering of fruit, which should be attended to by those old enough to know what they are doing, as it never pays to employ careless or irresponsible help at such times. The other item is the packing. This is always an item of the utmost importance. For the most perishable fruit, like strawberries, raspberries, etc., light, airy boxes and crates are best, and fruit should be assorted, boxed and crated so that it will not only carry to the best advantage but appear fresh and attractive. The person who gets a reputation for doing

this will, if he has a decent market and an honest consignee, obtain the best prices. I know that there are those who are inclined to question this statement, but I nevertheless believe that it will hold good. I have in mind to-day shippers who have established an enviable reputation and who always get the top prices by reason of honest goods and superior packing. But the preparing of fruit for shipment requires thorough and systematic attention to details, as well as facilities for doing the work. It cannot be done by rush and hurry and pellmell methods. Of course occasionally the greatest of care cannot place fruits in the market in prime condition. But in such cases they should be sold for what they really are. The two things that should go together are honest packing and honest treatment, and returns from the commission man or consignee.

Finally, it should be said that there is no royal road to success with fruits. Care, judgment and "eternal vigilance" are the price, and even with all these failures may occur. Frost will sometimes blast the brightest prospects; hail, wind and floods may devastate the most abundant fruitage. But vicissitudes are not confined to fruit growing. They seem to be a part of the economy of nature, and the possibility of such contingency, much as we may dislike to think of it, should enter into the calculations in the prosecution of easy enterprise. In every business emergencies occasionally arise that the utmost caution could not have foreseen. But, thanks to the Author of all, there are rewards in every work not to be measured entirely by the money standard. There are also "chances and changes keeping the hopeful a hundred to one." Let us then apply our faith and best judgment to the work before us, and leave no stone unturned in our efforts to produce fruits that will not only delight the eye, but please the taste and enrich the mind and heart as well.

DISCUSSION.

MR. GRIMES: We cannot emphasize MR. GIPSON's suggestions in reference to packing fruit trees. Trees are often imperfectly packed and this causes them to die. There is a book on the subject of packing and shipping, by Kellogg, which is very valuable to all engaged in fruit growing.

MR. FAUROT: Every one when starting in fruit-growing tries too many varieties. I find it pays to sort fruit.

MR. HAUSEL: How would grape vines be handled?

MR. FAUROT: You can prune now as well as any time. The old wood can be cut from vine after the leaves are out. Cut out the sucker and leaf laterals, take off all the wild wood; you will have to do this three or four times during the season. I never prune my grapes after July. In some cases a sucker might be preferred to an old cane. Covering, I believe, does no good except to bring out the blossoms earlier in the spring. It is hard to tell whether to cover grapes or not, but if I did I would wait till late in the fall. It is an injury to the vine to cover too early and also to cover too much.

MR. CARRINGER: I use the German system of pruning. I never prune after July. I took up this system three years ago, and thought it would be successful if done systematically.

On motion of MR. ACKERMAN, seconded by MR. BROTHERS, the meeting adjourned until 7:30 p. m.

7:30 p. m., June 19, 1889.

The association met pursuant to adjournment. Vice-President FELTON in the chair.

The subject for discussion was the "Grape Industry of Colorado."

MR. GIPSON: I am much interested in the grape and believe it is the most important fruit for Colorado. I am a believer in Colorado fruits, and Colorado grapes especially. I saw many grapes in California last October but didn't see any equal to those we find in Colorado. Colorado grapes have a flavor that others do not have. We should make the most of our opportunities in the culture of the grape; there is no limit to our possibilities here. There are several leading varieties that do exceedingly well. The Concord grape succeeds well here and in portions of the State in the neighborhood of Cañon City. The red grapes are the Delaware, Salem and Brighton, all first-class varieties, and do well for general planting. All do so well with me that I feel like recommending them for general culture.

MR. FELTON: On the south side of the Arkansas river the soil is a sandy loam, and all kinds of grapes do well. On the north side there is a heavy adobe soil and an impervious subsoil, so that the grapes does not do well.

MR. FAUROT: The apple has been considered the king of fruits, and I don't know but it is right, but when we look back and see the woe the apple has caused I think we might take the grape. When Moses sent his men to inspect the promised land they found clusters of grapes that required two men to carry them, and we should consider grapes one of the best fruits we can use. The Concord, Moore's Early, Warden and Champion are the best grapes we grow here of the black varieties.

The white grape is not satisfactory, or that is my experience. They should be left on the vine late. The Salem and Delaware do better on sandy soil I find. In growing grapes proper cultivation is necessary. Be sure to get good varieties, true to name, in making your selection.

MR. ANDERSON: What is the proper time for uncovering grapes in the spring?

MR. FAUROT: I don't know as there is any stated time to uncover grapes; you must be governed by the season, but uncover before the buds set.

MR. HAUSEL: Does irrigating in winter keep grapes back?

MR. FAUROT: Irrigation in winter will ruin them; at least that is my experience.

MR. FELTON: By burying grape vines deep—say six inches—will keep them back, is my experience. In Cañon City I find about the best time to uncover the vines is April 1.

MR. FAUROT: The oftener you irrigate grapes the nearer the surface come the roots.

MR. FELTON: The black grape sells better than the red or white. I believe the Worden will supersede the Concord.

DR. SHAW: What is the lowest price a grape can be sold for profit?

MR. FAUROT: You can make money at fifty cents a basket more than by any other fruit.

MR. BROTHERS: How often do you trim the vines in summer?

MR. FAUROT: Three times; the last time about the last week in July. Commence about this time.

The next paper was "The best blackberries and raspberries for commercial use," by G. M. ANDERSON, Boulder. [NOT FOUND.]

DISCUSSION.

MR. BROTHERS: I prefer the Wilson blackberry.

MR. ANDERSON: That is my experience also.

MR. FAUROT: I do not like the Wilson; it ripens too quick, and is subject too much to double blossom; the same is true of the Snyder. I found rust on the Wilson. I like the Loughlin.

MR. BROTHERS: The double blossom is our own fault; we are not careful enough in digging our plants for the first few years. I can't see any difference between the Wilson and the Wilson Jr.

MR. ANDERSON: The Snyder is of stock growth, the fruit small and not good color, it tastes well, however. The Wilson has a trailing habit; we can handle it quickly and that is what we want.

MR. GIPSON: Blackberries do not succeed very well at Greeley, but I think that the habit of the Wilson is one thing to recommend it. The red raspberry that does best is the Marlborough.

On motion of DR. SHAW, seconded by MR. FAUROT, the association adjourned until 10:30 a. m., June 20, 1889.

JUNE 20, 1889, 10:30 A. M.

The meeting was called to order by PRESIDENT FAROUT, and on motion adjourned to meet at 2:30 p. m.

JUNE 20, 1889, 2 P. M.

The meeting was called to order by PRESIDENT FAROUT. The minutes of the preceding sessions were read and approved.

Papers on the subject of "Rose Culture," by Emil Glauben, of Mt. Clair, and "Hints on the Window Culture of Plants," by John Berry, of Denver, were read:

ROSE CULTURE.

BY EMIL GLAUBEN.

At the present time our garden roses are at their best, and as every one is justly fond of them a short treatise will not be amiss.

We will first hear of the out-door, or "hardy" roses; these live out all winter, and, although many will survive the winter without protection, it is always advisable to cover with earth or straw. Most of us know just how to start our rose beds, but for the benefit of the uninitiated we will repeat the *modus operandi*. Having first selected as good a piece of ground as practicable, spade it thoroughly and then add a liberal coat of manure—I prefer cow manure—then re-spade; they should be planted at the same depth as formerly, excepting budded roses, which should be so planted as to leave the stalk an inch below the surface of the ground; this will, in a measure, prevent the wild stalk from growing. The following instance will illustrate: A gentleman having noticed some very fine Marble Morrison, a large white rose of the hybrid perpetual class, in our greenhouses, and although it is not a very satisfactory garden rose, determined to have some for his garden; this was on Easter, so when spring arrived we planted the roses for him; about the middle of November he stopped in and

informed us of the vigorous growth his roses had made through the summer and wished to borrow a pruning shears to prune them previous to covering the same; all went well until the next spring, when our friend came in one day in hardly the best of humor, and accused us of having committed a very grave error intentionally, (a very mild way of putting it). The proprietor protested his innocence, but all in vain, and I was despatched to investigate. The plants had all thrown out suckers below the bud, and as these always grow strongest, our rosarian had cut what he thought was the weakest wood, and so it was; but by so doing he left the wild stalk and lost all the true wood, therefore, in the spring he had a fine crop of wild roses. The next course will be thorough cultivation throughout the season. A mulching of manure is also beneficial, preventing excessive watering, which has a tendency to bake and crack the soil.

The appended list will assist in selecting varieties of known excellence:

Climbers—Prairie Queen, pink; Baltimore Belle, white.

Hybrid Perpetuals—General Jacqueminot, dark red; Magna Charta, pink; Anna de Diesbach, pink; Madame Plantiers, white; Baroness Rothschild, flesh.

We will now proceed to rose growing as practiced by florists for our winter cut-flowers. Cuttings are made in March; these are potted in two or two and one-half inch pots, thence to three inch and so on to four inch, five inch, according to the growth the plants make, for one of the main points in growing good roses, is never to check the growth, which would be the case were the plants to become pot-bound. Therefore it sometimes becomes necessary to make an extra shift to a larger size pot than is generally used; the planting into the green-

houses, either on tables or solid beds, is done in July and August; the house should be well shaded, and, as the shading soon wears off, the young plants will not be injured by being too much heated. Constant care to watering and syringing should be given, and until the first of September air can be left on day and night with some exceptions; after this time, however, the house should be closed each night. Through the summer months it is impossible to set a temperature, but as winter approaches this must be attended to. A temperature of fifty-five degrees to sixty degrees, and a day temperature of seventy to seventy-five degrees will be found to give the best results. As comparatively few roses can be profitably grown for winter bloom, a list may be of assistance to some:

Roses—Niphetos, white; The Bride, white; Sombrenie, white; Wm. F. Bennett, crimson; Duke of Connaught, crimson; Bon Silene, pink; La France, pink; Catharine Mermet, pink; Souvinier leun Ami, pink; Papa Gontier, pink; Perle des Jardnes, yellow; Countess de Frigneuse, yellow; Madame Chedame, yellow.

HINTS ON WINDOW CULTURE OF PLANTS.

BY JOHN BERRY.

To beautify our homes with the floral products of nature, is one of the difficult arts that amateur growers have to contend with, and to excel in the pursuit we have not only to possess considerable knowledge of the growth of plants, but also know how to make a judicious selection as to variety, character of habit of plant, etc., etc.

The first point of consideration is what position or window do you intend to grow your plants, which is

more difficult than it appears. In the age of dwelling-house architecture, the floral requirements are entirely overlooked, consequently the owner has to make the best of what facilities for plant growing he possesses, and this necessitates the judicious selection of plants, for not in all cases what you like best is best for you to procure, but what will do best under the circumstances. Many persons make random purchases of all the favorites, whether tropical or hardy, and mass them into one window or position. All windows have not the same aspect, nor have all rooms the same temperature; consequently we ought to select plants that will grow in either place, that are adapted to sunshine or shade, and if this distinction is made the amateur will have better success in plant growing. While treating upon the aspect question it might be well to point out another mistake made by the amateur. No matter at what period of the year they have plants in the house, they invariably select the sunniest window. Plant life likes moisture as well as heat, and there is very little of this at any period of the year in a hot sunny window, especially in Colorado; it is a popular mistake among amateurs that plants must have all the sun you can give them, whether indoors or out. Certainly plants do well when planted out in a rich soil, but they will do better with a moderate amount of sun when standing upon a dry window sill of the dwelling-house. Any large window where there is plenty of light all day without the direct rays of the sun upon the plants at its hottest period will be found more suitable than one fully exposed to the sun. But there must be some discrimination made in this respect, as some plants, like geraniums and heliotropes, prefer more sun than fuchsias or begonias. Many houses are so heavily shaded by adjoining buildings or large trees that it is advisable not to attempt to grow plants that are relied upon for their blooming qualities. Palms, begonias, ferns,

aspedistra, and such plants do well in partial shade. Palms are becoming very popular as a house-plant, and are not difficult to take care of. The large variety of begonias, both flowering and ornamental foliage, are also good house-plants and not very difficult to handle by the amateur. All foliage plants like to have their leaves kept clean by either washing with a sponge or spraying the foliage. Another class of plants which are very popular, although very seldom grown successfully in the dwelling-house, is the primula, cyclamen, mignonette, violet, pansy, etc. These plants do not require a hot room to grow them in; a temperature anywhere below forty and sixty degrees is much better than one above sixty degrees. These plants all like plenty of air and with the exception of primula and cyclamen, like plenty of good rich soil. A well-drained window box is a good thing to grow pansies and mignonette in. While the primula and cyclamen will do best in pots, as their drainage and watering must be carefully attended to. Keep these plants close to the glass; give them plenty of air, but not much hot sun. An occasional spray of tobacco water is very beneficial to the plants accommodated to the window box, and especially so is this necessary in the winter months when you cannot give much air. Window box culture is becoming very popular with those not having much garden space, and if the boxes are made large enough to hold plenty of good rich soil we can grow a great variety of plants in them. Good, well-grown, healthy plants should be selected for this purpose, as beauty in character depends largely upon the selection of plants and position they occupy. Climbing vines can be planted at each end of the box and used for training up around the windows or portico. The construction of window boxes is so simple that anyone wishing can have them. Rough lumber, faced with any kind of ornamental wood, makes a good

box for this country. Be careful and have your box fit tight upon your window sills, and fasten the ends with hooks and eyes to the window casing. Rustic boxes like rustic baskets, seem best adapted to our hot climate as they do not dry out so fast as slate, tile, terra cotta or wire. But all attempts to grow plants in any of these receptacles will not lead to any degree of success unless the soil is of a fertile nature, for it must be remembered that much growth and beauty are expected from a small quantity of earth, consequently it should be of the best character. Any good loamy soil of any color, well enriched with about one-third well-rotted manure will answer for most kinds of soft wooded plants.

MR. GRIMES led the discussion on "Rose Culture," and said:

I covered my roses this winter, and when snow came uncovered them and one-half of them died. I got the best results from the Hybrid Perpetual. The amateur does not propagate by budding. To know when the shoot is in best condition to propagate, if it breaks square off it won't do, but if it will bend it is in a condition to propagate by cuttings or layers. The varieties we have can be very easily propagated by layer process. To spray the rose bushes, use a soap made of tobacco and sulphur; this will destroy any insect, and does not injure the tenderest leaves. The Gen. Jacquemot is as good a rose for this country as any I know; it is always in demand. For mildew, I use flowers of sulphur. I sprinkle this over the roses through a wire screen while they have the dew on them; this is a sure remedy.

In reply to the question how to get rid of the red spider, MR. GRIMES said: Use water and soap, or sulphur and tobacco. Tobacco smoke is a good remedy for insects.

J. M. CLARK, of Denver, a paper on "Hints on Picking and Shipping Fruits," was read by JUDGE FELTON. The paper was as follows:

First—Grow the fruit in the best possible manner. Study your soil and varieties and see that they are adapted to each other.

Second—Have your fruit carefully picked, or pulled off. Many pickers, especially children, take the berry between the thumb and finger and pull it off. The pressure on the berry necessary to detach it from the stem invariably injures it and destroys its keeping qualities. In picking strawberries, pass the fingers under the berry, bringing the stem between the first and second fingers, and lift the berry from the stem; or with the thumb and fore finger take hold of the stem and break it off, leaving a short stem on the berry. If a berry is defective or over-ripe it is far more profitable to drop it on the ground than to put it in the box, expecting to make money by the operation. A few small or defective berries in a box, otherwise fine fruit, will reduce it to second grade, which always means a lower price. An over-ripe or mashed berry will start decay at once, and soon injure the sale of the whole box. Currants should never be stripped from the stem; each stem should be picked intact; the stem will wilt and allow the fruit to settle closer together, therefore, the boxes should be very full in order that they may be full when they reach their destination.

Third—Be sure you know yourself how the fruit should be picked, then instruct your pickers carefully how you want it done, then see to it that your instructions are carefully carried out.

Fourth—If you are raising fruit in considerable quantities it will pay to grade it.

Fifth—In shipping fruit see that the crate is properly nailed; mark the variety and also the quality.

Sixth—If you ship to a commission house, do not send a letter a day or two after they are sent telling what nice berries they are and how much they ought to bring. The chances are they will be sold long before your letter has been received. If possible, notify your commission house before the fruit is sent. He can often have them sold on arrival at their full value. Nice fruit, nicely put up will generally bring a good price, though there are circumstances at times which makes it impossible for the merchant to sell at any reasonable figure. The market may be overstocked, the fruit may arrive at too late a time in the day, after the trade for that day is over. If possible, so arrange your shipping that your commission merchant will know when and how much fruit he will receive from you; it will help him very much in disposing of your consignment to advantage. If you ship direct to a retailer you have a right to expect that he will give you more for your fruit than a commission merchant can by the amount of the commission.

To sum up the whole matter, grow your fruit well, pick it carefully, give good honest measure, find the best market you can and place your fruit on that market in an attractive form, and you then have a right to expect the best price that the market will afford.

JUDGE FELTON reported as follows on the matter of holding a meeting in the southern part of the State:

Your committee appointed to consider the matter of a State Horticultural Exhibit this fall, at some one or more points in the southern part of the State, beg leave to report as follows:

We would recommend that such a fair be held at Cañon City, September 25 and 26, under the auspices of this association, and that the exhibit so made be taken to Pueblo for exhibition at the State Fair to be held at that place the first week in October; and, further, that the detail necessary for carrying out the above to be under the charge of the Executive Committee of this association.

Respectfully,

W. B. FELTON,
DAVID BROTHERS,
JAMES ACKERMAN,
Committee.

On motion of DR. SHAW, the report of the committee was adopted.

JUDGE FELTON presented the following additional by-law:

SECTION 13. In the competition for premiums no exhibit shall be entitled to a double premium. In all notices issued by the Secretary relative to premiums at any fair held under the auspices of this association he shall mention the day and hour that all entries shall be closed, and no article received subsequent to such time shall be considered in the award of premiums.

JUDGE FELTON moved the adoption of the by-law.

The motion was seconded by MR. BROTHERS, and carried.

After some discussion, JUDGE FELTON moved, and MR. BROTHERS seconded, that the above motion be reconsidered. The motion was carried.

On motion duly made and seconded, the first paragraph of the by-law was stricken out and the by-law adopted.

On motion duly made and seconded, all unfinished business was referred to the Executive Committee for action.

On motion of DR. SHAW, all matter remaining on the tables not claimed by the exhibitors was left in the hands of the President for distribution.

On motion of DR. SHAW, the association extended a vote of thanks to the Boulder press for the interest taken in the meeting and the full and complete manner in which the proceedings had been reported.

On motion of PRESIDENT FAUROT, seconded by MR. BROTHERS, a vote of thanks was extended to all those who gave special premiums.

On motion of DR. SHAW, seconded by MR. BROTHERS, the association complimented Miss Grace Patton, Instructor at the State Agricultural College, for the careful manner in which she had reported the proceedings of the association.

On motion, the meeting adjourned.

BOULDER, June 20, 1889.

Executive Committee met pursuant to adjournment.

Present: C. S. FAUROT, W. B. FELTON, DAVID BROTHERS and ALEX. SHAW.

On motion, an appropriation of \$200.00 was made to pay premiums on Horticultural exhibits at a meeting to be held at Cañon City in October, 1889, specific date to be hereafter fixed.

Secretary was directed to correspond with the authorities of the Colorado Industrial Association and the Pueblo State Fair Association as to terms of making a Horticultural exhibit at their respective fairs, and report results to committee.

Secretary was directed to pay Miss Grace Patton, out of any moneys in his hands arising from receipts of

membership fees, her bill, for reporting proceedings of Boulder meeting, as follows:

| | |
|---|----------------|
| Per diem, two days, at \$5.00 | \$10 00 |
| Railroad fare | 3 60 |
| Hotel bill | 3 00 |
| Hack fare | 50 |
| Stationery | 25 |
| Total | <u>\$17 35</u> |

The following warrants were directed to be drawn on the Treasurer in payment for premiums at Boulder meeting:

John Brierley, warrant No. 11—

| | |
|--|----------------|
| Best show Currants | \$ 2 00 |
| Best and largest collection Garden Vegetables | 5 00 |
| Best six heads Cabbage | 2 00 |
| Best six Early Beets | 1 00 |
| Best six heads Lettuce | 1 00 |
| Best six bunches Radish | 1 00 |
| Best four quarts Peas | 1 00 |
| Best six Cucumbers | 1 00 |
| Largest and best show Greenhouse Plants (second prem.) | 3 00 |
| Best collection Geraniums in bloom | 2 00 |
| Best show Cut Pansies | 1 00 |
| Best and largest variety Cut Annuals | 1 00 |
| Best collection Fuchsias | 2 00 |
| Best collection Palms | 3 00 |
| Best collection Ferns | 3 00 |
| Best show Hanging Baskets filled with Plants | 3 00 |
| Total | <u>\$32 00</u> |

Edward Hubbard, warrant No. 12—

| | |
|--|----------------|
| First premium, largest and best show Greenhouse Plants | \$12 00 |
| Best show Foliage Geraniums | 2 00 |
| Best show Cut Perennials | 1 00 |
| Best collection Climbing Plants | 2 00 |
| Best single Fuchsia | 1 00 |
| Best show Rustic Stands filled with Plants | 2 00 |
| Total | <u>\$20 00</u> |

Mrs. Avery Gallup, warrant No. 13—

| | |
|------------------------------------|---------|
| Best show Floral Designs | \$10 00 |
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HORTICULTURAL AND FORESTRY ASSOCIATION. 347

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| J. S. Ibbeson, warrant No. 14— | |
| Best show Gooseberries, any variety | \$ 1 00 |
| Chas. Wilmore, warrant No. 15— | |
| Best six varieties of Strawberries | \$ 3 00 |
| W. W. Wilmore, warrant No. 16— | |
| First premium, best and largest collection of Strawberries, not less than one quart each variety | \$10 00 |
| E. T. Carr, warrant No. 17— | |
| Second premium, largest and best collection Strawberries, not less than one quart each variety | \$ 5 00 |
| W. W. Wilmore, warrant No. 18— | |
| Best collection Cut Roses | \$ 3 00 |
| M. G. Smith, warrant No. 19— | |
| Best collection Hand Bouquets | \$ 3 00 |
| Best show Cherries, any variety | 2 00 |
| | <hr/> |
| | \$ 5 00 |
| M. G. Anderson, warrant No. 20— | |
| Best six bunches Onions | \$1 00 |

The following bills were allowed and warrants on the Treasurer were drawn for their payment:

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| C. J. Kelley, warrant No. 21— | |
| Printing 500 premium lists Boulder Meeting | \$12 50 |
| <i>Boulder Daily Miner</i> , warrant No. 22— | |
| Printing programmes Boulder Meeting | \$ 2 50 |

Warrants to respective members of Executive Committee for attendance at this meeting were drawn on Treasurer, as follows:

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| W. B. Felton, warrant No. 23— | |
| Per diem, two days | \$ 5 00 |
| Hotel bill and railroad fare | 9 75 |
| | <hr/> |
| | \$14 75 |
| David Brothers, warrant No. 24— | |
| Per diem, two days | \$ 5 00 |
| Hotel bill and railroad fare | 5 50 |
| | <hr/> |
| | \$10 50 |
| C. G. Faurot— | |
| Per diem, three days | \$ 7 50 |

On motion, President C. S. FAUROT was authorized, in the absence of Treasurer DAVIS, to act as Treasurer of the Association, and he was directed to draw the warrant from Auditor of State for \$1,000.00, annual appropriation for 1889, and report proceeds to Executive Committee.

Adjourned.

CANON CITY, October 1, 1889.

Association met in pursuance of the following programme:

PROGRAMME OF THE FALL MEETING

OF THE

Colorado State Horticultural and Forestry Association.

AT

CANON CITY, COLORADO,

Tuesday and Wednesday, October 1 and 2,

1889.

TUESDAY, 10 O'CLOCK A. M.

- 1st. All Exhibitors and Officers of the Association are expected to be at Exhibition Hall and see that all preliminary work is done, preparatory to the prompt execution of the following programme.

2 O'CLOCK P. M.

- 2d. Address of Welcome HON. THOMAS S. WELLS
 3d. Response WEBSTER DAVIS, Esq., Pueblo
 4th. Secretary's Report DR. ALEX. SHAW, Denver
 5th. Orchard Culture . . . JAMES ACKERMAN, President Northern Horticultural Society, Hygiene, Boulder County.
 6th. Pruning Fruit Trees . . SAMUEL WADE, Paonia, Delta County
 7th. Small Fruits WM. DAVIS, Denver
 8th. The Grape W. A. HELM, Cañon City

HORTICULTURAL AND FORESTRY ASSOCIATION. 349

EVENING, 7:30 O'CLOCK.

- 9th. Fertilizers for Fruit Culture . . . PRESIDENT INGERSOLL, State Agricultural College, Ft. Collins.
- 10th. Horticulture for the Farm . . . J. H. HARRISON, Cañon City
- 11th. The Strawberry DALL DEWEERSE, Cañon City
- 12th. Home Adornments MISS GRACE PATTON, Ft. Collins

WEDNESDAY, 10 A. M.

- 13th. Meteorological Conditions of Colorado adapted to Horticulture PROF. CARPENTER, State Agricultural College, Ft. Collins.
- 14th. The Colorado State Horticultural and Forestry Association and Its Work S. R. PRATT, Denver
- 15th. President's Address C. S. FAUROT, Boulder.
- 16th. Report of Committee on Awards.

2 O'CLOCK P. M.

- 17th. Insects Injurious to Horticulture, and Insecticides, PROF. JAMES CASSIDAY, State Agricultural College, Ft. Collins.
- 18th. The Peach and Pear C. L. HUGHES, Denver
- 19th. Floriculture MRS. ABBIE BAIN, Pueblo
- 20th. Forestry in Colorado . . . COL. E. T. ENSIGN, State Forestry Commissioner, Colorado Springs.
- 21st. Estimates on Growing Forest Trees for Timber . E. MILLERSON, Denver.
- 22d. Miscellaneous Business.

NOTE.—All Horticultural Exhibits at Cañon City meeting will be transferred to the Pueblo State Fair and there be supplemented by a general exhibit from all parts of the State. The largest exhibit ever made in the State will be at the Fair at Pueblo. The Association contemplates holding evening discussions on subjects germane to Horticulture during the Pueblo Fair, due notice of which will be given in Pueblo papers.

C. S. FAUROT, *President.*

ALEX. SHAW, *Secretary.*

W. B. FELTON, Vice-President at Large, in the Chair.

The forenoon was spent in entering and placing on the tables the following list of fruits exhibited at the State Fruit Exhibit at Cañon City, Colorado, October 1 and 2, 1889, under the auspices of the State Horticultural and Forestry Association:

FREMONT COUNTY.

W. B. FELTON.

Pears—Sheldon, Buerre Bosc, Buerre d'Anjou, Bufum, Second Bloom Bartlett, Seckel, nine varieties for name.

Apples—Sweet, Vandever Pippin, Limber Twig, Wolf River, Red Permain, Martha Crab, Virginia Seedling, Wine Sap, Fall Pippin, Ben Davis, Seek-No-Farther, Tallman Sweet, Grimes' Golden Pippin, Perry Russet, Hyslop Crab, Golden Russet, Jonathan, Willow Twig, Hall's Crab, Baldwin, Fulton, Wallbridge, Dominie, Fameuse or Snow, Yellow Bellflower, Northern Spy, Fall Pippin, six varieties for name.

Quince—Orange.

Bottled Fruits—Pears, German Prunes, Plums, Peaches, Nectarines, Cherries.

JOHN GRAVESTOCK.

Peaches—Seedlings No. 14, 8, 3, 11, 15, 10, 13, 5, 7, 2, 4, 6, 9, 12.

Pears—Le Conte, Bartlett, Bouquet, Seckel, Mt. Vernon, Vicar of Wakefield, Louise Bon d'Jersey, Kieffer, Duchess.

Apples—Maverick Sweet, Family, Willow Twig, Missouri Pippin, Rome Beauty, Striped Winter Pearmain, Second Duchess of Oldenburg, Seedling Rhode Island

Greening, Wealthy, Carter's Blue, Winter Pearmain, Ben Davis, Rawle's Janet, Flora Bellflower, Baldwin, Kendall's Choice, Fameuse, Lowell, Twenty Ounce, Alexander, Rankin's Favorite, Rhode Island Greening, Jonathan, Fall River, Grimes' Golden, Walbridge, Wine Sap, Oconee Greening, Maiden Blush, Limber Twig.

Plums—Imperial Gage, Pond's Seedling, Yellow Egg, Shropshire Damson, Duane's Purple, Prince's Yellow Gage, Lombard, Smith's Orleans.

Grapes—Fremont or Helm Seedling, Brighton Seedlings No. 8, 9, 6, 5, 4, 7, 10, 4, 2; Chasselas Seedling No. 2 and 1; Black Hamburg, Martha, Ionia, Brighton, Goethe, Lady, Pocklington, Muscat of Alexander, Mission, Muscatel, Catawba, Concord, Niagara, Salem, Duchess, Prentiss, Gravestock's Seedling.

R. A. GARDNER.

Apples—Lady, Wagner, Snow, Plum Cider, Red Winter Pearmain, Gardner's Seedling, Northern Spy, Hyslop Crab, Pewaukee, Bellflower, Royal Limber Twig, Rawle's Janet, Seek-No-Further, Walbridge, Maiden Blush, Improved Wine Sap, Hall's Crab, Missouri Pippin, Ben Davis.

JOHN LOCKE.

Peaches—Forty-eight Seedlings.

Apples—Snow, Cole's Quince, Flora Bellflower, Virginia Greening, Wine Sap, Ben Davis, Pound, Vandever Pippin, Rawle's Janet, Isham Sweet, Willow Twig, Rambo, Golden Pippin, Early Fall Rambo, eleven for name.

Pears—Bartlett, Sheldon, three for name.

TOOF BROTHERS.

Apples—Eighty-three varieties of Seedlings, Hyslop Crab, Siberian Crab.

Pears—Seedling No. 17, Pear Grafted on Quince.

JESSE FRASER.

Apples—Ben Davis, Cooper, Baldwin, Vandever Pippin, Fameuse, Rambo, Grimes' Golden, Keswick's Codlin, Mountain Sweet, Jonathan, Northern Spy, King Thompson Co., Walbridge, Colorado Orange, Willow Twig, King, Roxbury Russet, Wine Sap, Sweet Romanite, Yellow Bellflower, Sweet Pear, Perry Russet, Autumn Strawberry, Striped Gilliflower, Jeffrey, Romanite, Missouri Pippin, Smoke House, Red Winter Pearmain, Maiden Blush, Seek-No-Further, Huntsman's Favorite, Golden Russet, Rawle's Janet.

Pears—Seckel, Sheldon, Flemish Beauty, Winter, twelve for name.

Four varieties of Peaches for name.

W. C. CATLIN.

Apples—Colorado Red Streak, Pippin. Walbridge, Rawle's Janet, Romanite, Twenty Ounce, Gill Flower, Jonathan, Ben Davis, Maiden Blush, Stump, Rambo, Catlin Seedling, Melano, Summer Pearmain, Pium Cider, Water Case, Winter Pearmain, Catlin Seedling No. 2, Transcendent, Nick-a-Jack, Haas, Kenard Choice, Snow, Fall Strawberry, Wine, Sweet Pear, Northern Sweet, Wealthy, Tallman's Sweet, Willow Twig.

Pears—Duchess, Sleeping Beauty, Congress, San Juan, Bartlett.

Seedling Peaches.

Grapes—Elvira, Catawba, Sultana, Concord, Salem, Ionia, Muscat, Isabella, Flaming Tokay.

MRS. S. A. SCOTT.

Apples—Paradise Sweet, Willow Twig, Hyslop Crab, Ben Davis, Limber Twig, Red Streak, Rawle's Janet, Spice River Sweet, Fall Top.

Pears—Clapp's Favorite, Monarch.

Peaches—Crawford's Late, Crawford's Early.

L. J. TEMPLIN.

Apples—Ben Davis, Golden Beauty, Lawver, Rawle's Janet, Jonathan.

Templin's Seedling Peach.

WM. BAKER.

Apples—Hyslop Crab, Rawle's Janet, Dominie, Sweeting, Lawyer, Wine Sap, Jonathan, Limber Twig, Red Russian, Haas, Empire Russian, Uncle Sam, Missouri Pippin, Fall Pippin, Maiden Blush, Red Winter Pearmain.

D. C. GREEN.

Seventeen plates of apples, three plates of pears.

L. U. COFFMAN.

Apples—Pewaukee, Ben Davis, five for name, Autumn Snow.

One plate of pears for name, one plate of Flemish Beauty.

Three plates of peaches for name.

JEFF TONG.

Apples—Tong's Seedling, Ben Davis, two for name.

JOHN PIERCE.

Apples—Ben Davis, Wine Sap, Jonathan, six for name.

Thirteen plates of peaches for name.

JOHN KELLEY.

Apples—Wine Sap, Willow Twig, Walbridge, Ben Davis, Rawle's Janet, one for name.

W. R. FOWLER.

Apples—Wine Sap, Ben Davis, Pewaukee, Striped Gilliflower.

Pears—Duchess, Standard, Louise Bon d'Jersey.

TRUE BLANCETT.

Seven plates apples for name.

Two plates pears for name.

JAMES G. HARVEY.

Four plates apples for name.

W. H. STOVER.

Grapes—Golden Chasselas, Black Hamburg.

Apples—Wine Sap, Willow Twig, Ben Davis, Jonathan, Rawle's Janet, Gilpin, Missouri Pippin.

W. H. TROUT.

Apples—Bellflower, Wine Sap, Ben Davis, Limber Twig, Jonathan, Pewaukee.

HENRY SARTOR.

Apples—Pewaukee, Maiden Blush, Wine Sap, Lawyer, Ben Davis.

MRS. PAUL S. ROSS.

Grapes—Golden Pocklington, Concord, Amber Queen.

Apples—Walbridge, Winter Pearmain, Northern Spy, Ben Davis, Madam Ross Seedling, one for name.

One plate pears for name.

E. B. ALLING.

Apples—Wealthy, one for name.

Pears—Flemish Beauty, one for name.

A. D. COOPER.

Four Cooper Seedling peaches.

Ben Davis Apples.

Flemish Beauty pears.

HUNT BROS.

Grapes—Concord, Salem, Goethe, Delaware, Duchess.

Apples—Jupiter, New York Pippin, one for name, Smith's Cider.

Pears—Buerre d'Anjou.

J. W. MILSOM.

Pears—Kieffer, Duchess, one for name, Flemish Beauty, Bartlett.

Apples—Willow Twig, Ben Davis, Jonathan, one for name.

GEO. O. BALDWIN.

Grapes—Barry, Brighton, Lindley, Wilder, Delaware, Elvira, Missouri Risling, Martha, Lady.

Plums—Pond's Seedling, Green Gage, Lombard, Parker's Seedling, Imperial Gage, Blue Damson.

Pears—Duchess d'Angouleme, Seckel, Tres Donard, Kieffer, Flemish Beauty.

Apples—Rawle's Janet, Ben Davis, Broadwell Sweet, Wagoner, Wine Sap, Roman Beauty, Hyslop Crab, Walbridge, Missouri Pippin, Tallman's Sweet.

JOHN WYLSON.

Grapes—Niagara, Goethe.

Two kinds pears for name.

ANSON RUDD.

Apples—Ben Davis, Rudd's Seedling, Fall Wine, Wine Sap, Fall Sweet.

Grapes—Seedless Sultana, two for name.

Orange quince.

A. A. IRELAND.

Apples—Smith's Cider, Fallwater, Lawver, Willow Twig, Plum Cider, Rhode Island Greening, Rawle's Janet, Wine Sap, Limber Twig.

Pears—Louise Bon d'Jersey, Buerre d'Anjou, Duchess, Seckel, Flemish Beauty, Kieffer.

LYMAN ROBISON.

Apples—Willow Twig, Wine Sap, New York Pippin, Jonathan.

Pears—Kieffer, Hybred, Urbanist, Flemish Beauty, Louise Bon d'Jersey.

GEO. F. M'RAY.

Apples—Ben Davis, Fulton, Bellflower, Fall Pippin, Romanite, Vandever Pippin, Jonathan, Wine Sap, Wealthy, Wagener, Porter, Red Winter Pearmain.

Three plates peaches for name.

Grapes—Agawam, Salem, Isabella, Concord, Catawba, Delaware, Duchess.

MRS. A. M. HAWLEY.

Princess Plum.

W. B. M'GEE.

Hyslop crab.

Pears—Emutie L. Heyti, Beya de la Motte, Princess.

JAMES CURTIS.

Apples—Ben Davis, Fall Jim, Flora Belle, Wagener, Russian Haas.

JOHN W. JOHNSON.

Apples—Northern Spy, Ben Davis, Fremont Seedling, White Winter Pearmain, Oil Creek Seedling.

W. A. STUMP.

Apples—Walbridge, Alexander, Snow, Roman Beauty, Ben Davis, Limber Twig, Wagener, Raule's Janet, Sweet Pear, Hyslop Crab, Red Winter Pearmain, Wine, Wine Sap.

J. H. HARRISON.

Pears—Buerre d'Anjou, Mt. Vernon, two for name.

Plums—Green Gage, German Prune, Damson.

Apples—Standard Crab, Willow Twig, Golden Russet, Seek-No-Further, Russet, Lady Finger, Rawle's Janet, Grimes' Golden, Wealthy, Pippin, Yellow Bellflower, Plum Cider, Rambo, Janet, Perry Russet, Red Winter Pearmain, Ben Davis, Missouri Pippin, Lawyer, Flora Bell, Wine Sap, Jonathan, ten for name.

DELTA COUNTY.

W. S. COBURN, PAONIA.

Apples—Alexander, Willow Twig, Limber Twig, Haas, Wine Sap, Missouri Pippin, Walbridge, Wagener, Maiden Blush, Lady Sweet, Sweet Bough, Ben Davis, Wealthy, Hubertson, None-Such, Yellow Bellflower.

Pears—Duchess d'Angouleme, Buerre d'Anjou, Flemish Beauty, Bartlett, Kieffer, Seckel, S. D. Congress, Le Conte.

Plums—Mooney, German Prune, De Soto, Miner, Native, Pond's Seedling, Kelsey Japan, Wild Goose.

Peaches—Elberta, Smock, Salway, Stump, Heath Cling, Old Mixer Cling, Henrietta Cling, Gov. Garland, George IVth, Crawford Late, number one to eight common seedling, number one to four, Colorado seedling.

Grapes—Muscat, Zinfindel, Sweetwater, Seedless Sultana, Moore's Early, Concord, Hyland Hardy, Wyoming Red, Empire State.

Crab Apples—Hyslop, Transcendent, Soulard, Queen's Choice, Martha, Yellow Siberian.

S. WADE.

Peaches—Chinee Cling, Crawford, Heath's Cling, Snow, fourteen seedlings.

Bottled—Nectarines, Apricots, Blackberries, Crown-hole Gooseberries, Downing, Jessie Strawberry, Fay's Currants, Early Richmond Cherries.

Plums—French Prunes, Yellow Egg, German Prunes, Lombard, Green Gage, DeWeese Native, Damson, Land.

Pears—Duchess, Bartlett, Flemish Beauty, Kieffer.

Grapes—Black Hamburg, Seedless Sultana, Goethe, Black Malvoiry, Early Victor, Zinfindell, Jefferson, Muscat of Alexander, Delaware, Clinton, Niagara, Mas-soit, Empire State, Hartford Prolific, Elvira, Concord, Catawba, Salem, Pocklington, Agawam, Ives' Seedling, Brighton, Wyoming Red, Sweetwater, Taylor's Bullet, Telegraph or Christine, Dracot Amber, Lady Washington, Missouri Risiline, Jamesville.

Apples—Pewaukee, Willow Twig, Haas, Bailey's Sweet, Wagener, Missouri Pippin, Rambo, Fameuse or Snow, Ben Davis, Limber Twig, Autumn Strawberry, Raule's Janet, Maiden Blush, Tallman Sweet, Wine Sap, Stark, Keswick's Codlin, McMahon's White, Virginia Greening, Walbridge, White Winter Pearmain, Dominie, Lawver, Jonathan, Duchess, St. Petersburg, six varieties for name.

Crab Apples—Siberian, Orange, Transcendent, Martha, Hyslop.

JEFFERSON COUNTY.

JOHN TOBIAS.

Plums—Miner, Bradshaw, Weaver, Cole's Golden Drop, Shropshire Damson, Botan, Forest Rose Seedling.

Apples—Yellow Transparent, Transcendent, Hyslop, two for name, Hyslop, Charlamainoff, Alexander, Wealthy, Yellow Bellflower, Ben Davis, Missouri Pippin, Longfield, Chenango Strawberry, Duchess, Stark, Fameuse, Walbridge, Bordsdorf, White Winter Pearmain, Jonathan, Wine, Rawle's Janet, Golden Beauty Crab, Tallman Sweet.

Pears—Flemish Beauty.

HARPEN DAVIS.

Two plates pears.

J. J. YOUNG.

Apples—Lady, Maiden Blush.

HENRY GREEN.

Apples—Willow Twig, White Winter Pearmain, one for name.

CHARLES WILLIAMSON.

Apples—Duchess of Oldenburg, Alexander, Lawver.
Two plates of pears for name.

MRS. COOK.

Five plates of pears for name.

WM. LEE.

Apples—Harvest Queen, Fall Baldwin, Summer Queen, Wagener, Golden Russet, St. Lawrence Seedling, Briar Sweet, Maiden Blush, Smith's Cider, seven for name.

MR. M'ALROY.

Apples—Summer Queen, three for name, Red Winter, Pearmain, Tulpehocken; Grimes' Golden, Maiden Blush, Wagener, Jonathan.

DAVID LEE.

Apples—Pewaukee, White Winter Pearmain, Haas, Ben Davis, Wealthy, one for name.

Pears—Flemish Beauty.

J. BROWN.

Apples—Willow Twig, Autumn Strawberry, Wine, Seedling, one for name.

E. BOSLY.

Apples—Bellflower, Snow, four for name, Jonathan, Duchess of Oldenburg, Rawle's Janet.

Pears—Bartlett, Flemish Beauty, two for name.

DAVID BROTHERS.

Apples—Duchess of Oldenburg, Rawle's Janet, Pewaukee, Little Romanite, Northern Spy, three for name, Yellow Siberian, Snow, Autumn Strawberry, Jonathan,

Wealthy, Whitney No. 20, Hoylore, Alexander, Missouri Pippin, Hyslop Crab, Ben Davis.

Pears—Bartlett, two for name.

H. STEWART.

Apples—Willow Twig, Plum Cider, two for name, Pewaukee, Wine Sap, Snow, Wealthy, Hyslop.

MRS. BAKER.

Apples—Roxbury, Russet, Famuese, three for name, Janet, Wagner, Red Pearmain, Sava, Ben Davis, Limber Twig, Autumn Strawberry, Perry Russet, Loveland Crab, Large Romanite, Romanite, Winter Wine, Tallman's Sweet.

Pears—Sheldon, two for name, Flemish Beauty, Bartlett.

HENRY LEE.

Plums—Green Gage.

Apples—Seek-No-Farther, Paradise, Briar Sweet, Large Crab, Flora Bell, Perry Russet, Ben Davis, two for name.

W. M. BENEDICT.

Apples—Stark, Whitney No. 20, Cole's Quince, Tallman's Sweet, Transcendent Crab, Northern Spy, two for name.

MRS. RICHARDS.

Apples—Swaar, New York Greening.

Pears—Two for name, Flemish Beauty, Seckel, Louise Bon d'Jersey.

BOULDER COUNTY.

MRS. PERRY WHITE.

Apples—Hass, one for name.

M. G. SMITH.

Grapes—Lindley.*Peaches*—Seven Seedlings.

J. A. DAVIS.

Plums—Prince Albert, German Prune.

E. J. PERRIN.

Plum—One plum, no name.

R. WOODBURY.

Plums—Peach Plum, Geass, two seedlings.

GEO. WEBSTER.

Apples—Pewaukee, Perry Russet, Large Romanite,
two seedlings, R. R. Pearmain.

JOHN M. GOSS.

Apples—Hass, Fall Strip, Utter's Red.

M'INTOSH.

Apples—Pewaukee, one for name.*Pear*—Flemish Beauty.

GEORGE HEPNER.

Apples—Rock Russet, Maiden Blush, Rambo, Limber
Twig, Northern Spy, Wealthy.

JOHN BRIERLEY.

Apples—Five Ben Davis seedlings, Transcendent
Crab.*Grapes*—Agawam, Champion, one for name, Martha,
Brighton, Delaware, Vergenese, Telegraph, Hartford.*Plums*—Miner, Weaver, Shropshire.*Pears*—Bartlett.

ARAPAHOE COUNTY.

F. E. BIRD.

Apples—Pewaukee, Alexander, two. for name,
Wealthy, Autumn Strawberry, Ben Davis, Isham Sweet.

MESA COUNTY.

W. H. COFFMAN, WHITEWATER.

Apples—Alexander, Isham Sweet, Haas, Ben Davis,
Utter's Red, Grindstone, Pewaukee, Tulpehocken, Wil-
low Twig.

Pears—Duchess, Bartlett, Kieffer's Hybrid.

J. R. PENNISTON.

Apples—Tulpehocken, Maine, Ben Davis, Willow
Twig.

R. W. SHOPSHIRE.

Apples—Wagener, Pewaukee, Haas, Alexander,
Willow Twig, Grindstone, Ben Davis, Hyslop Crab,
Wine Sap, White Winter Pearmain.

Pears—Duchess (d' Angouleme), Bartlett, Edmonds,
Flemish Beauty, Kieffer's Hybrid.

E. BLANE, GRAND JUNCTION.

Apples—Famuese or Snow, Willow Twig, White
Winter Pearmain, Haas, Ben Davis, Alexander.

O. M. OLDS.

Pears—Kieffer's Hybrid, Duchess.

Peaches—Culinary, Henrietta, Skadley, Salvary, Old
Mixon, Colorado.

Grapes—Muscatel, Flaming Tokay, Malaga, Muscat
of Alexander, Emperor.

C. W. STEEL.

Apples—For name.

MONTROSE COUNTY.

WM. NEUGART.

Apples—Rambo, Wagener, Ben Davis.

S. H. NYE.

Apples—Magog, Pumpkin Sweet, Ben Davis, Tallman's Sweet, Rhode Island Greening, Haas.*Pears*—Flemish Beauty, Edmond's, Indian Queen, Duchess, Bartlett.

CAÑON CITY, Oct. 1, 1889.

Association convened at 2 o'clock p. m., JUDGE FELTON in the chair.

HON. THOMAS WELLS delivered an address of welcome on behalf of the city, replete with a hearty welcome and good cheer, reviewing the pioneer days of horticulture in contrast with the present.

The Cañon City Silver Cornet Band enlivened the exercises at intervals with good and well-timed music.

WEBSTER DAVIS, Esq., of Pueblo, delivered an eloquent and appropriate address responsive to the address of welcome, treating horticulturists as pre-eminently the benefactors of all ages in the history of the world.

DR. SHAW, Secretary, then read the following report of the status of horticulture the current season in Colorado:

SECRETARY'S REPORT.

The fruit crop of Colorado for the current year, 1889, is unprecedented in the history of the State, as to small and tree fruits. All tree fruits of various kinds of proper age has been wonderfully prolific. Especially to be

noted are cherries, plums, peaches, nectarines, apricots and pears. Where trees of mature age in all parts of the State have been planted, the general rule is these kinds have yielded a prolific crop, much more abundant than for the past nine years.

I have recently made a personal examination of most of the principal fruit-producing regions of the State, and find the following state of things: The last Legislature passed an act creating a Board of Emigration and Statistics, and made it the duty of the Commissioner in charge to secure a comprehensive exhibit of the resources of the State, and take it to some point East as the Governor may designate. Accordingly, Governor Cooper named the Chicago Exposition. Commissioner Skiff appointed C. S. FAUROT, President of our Association, and myself special agents to make a collection of the agricultural and horticultural products. Upon my part it has involved a travel of about twenty-five hundred miles and about forty days of my time. By an agreed assignment PRESIDENT FAUROT canvassed all counties north of Denver, and I spent my time south. Aided by the producers and horticulturists generally of the State, we have been successful in making a collection that will in nowise compromise the State, Commissioner Skiff or any one connected with the display. PRESIDENT FAUROT is now on duty with the exhibit at Chicago and reports the show pre-eminently a success. The show on our tables to-day is a duplicate of the Chicago exhibit in the horticultural line. This show will approximate in varieties, 175 of apples, 20 pears, 15 peaches, 21 plums, 40 grapes, 1 nectarines, 2 quinces. The object lesson now before us is in the main from the counties of Laramie, Boulder, Jefferson, Fremont, Montrose, Delta, Mesa and Pueblo. Among the things of special note in this connection I here state that the area

of fruit culture extends from the extreme Northern to the Southern line. In a meteorological point of view no portion of the State is sterile as to fruit producing below an altitude of six thousand feet, conditioned upon a water supply and proper culture. As to apples and pears all parts of the State are equally productive, but the Western and Southern portions of the State seem to have the best combination of conditions to grade stone fruits and the more tender varieties of grapes, cherries and plums. As indicated by the current season there is not so wide a difference as to the crops of stone fruits in all parts have been good where care and culture have been equal. The counties of the Arkansas, San Juan and Montezuma valleys are developing conditions to grow stone fruits and tender grapes with success. Among those that are to the front in this line may be noted those of the Uncompaghre, Gunnison and Grand valleys. The altitude, soil and climate of Mesa county admits of the growth of tender varieties of cherries, such as Gov. Wood, Napoleon and Bigarne; grapes, such as Tokay, Tenfendel, Rasin, Muscatel, Muscat, Seedless, Sultana and Rose of Peru; peaches, such as Alexander, Early and Late Crawford, Stump of the World, and most all of the later sorts; plums, such as Japanese, Pond's Seedling, German and French Prunes, Green Gage varieties, Large Yellow Egg. And what is true of Mesa county will apply to the valleys tributary to the Grand.

The fruit industry of the State is the coming industry all over the State. God has blessed us with conditions of success and man only will make a failure. The facilities of obtaining nursery stock is rapidly increasing. Among the reliable nurserymen I here note the names of James Ackerman, of Hygene, Boulder county; Stark Brothers, of Littleton, Arapahoe county; A. E. Gipson,

of Greeley, Weld county; Dall Deweese and John Gravestock, of Cañon City, Fremont county; Mr. McGranahan, Delta, Mr. Coborn and Samuel Wade, of Paonia, North Fork, Gunnison, and J. F. Spencer, of Grand Junction, Mesa county. There are quite a number of gentlemen that does a sub-business, who are equally reliable and are residents of our State. As a rule, in a business transaction, I prefer to trade with those I know. Life is too short to make a mistake in the purchase of nursery stock.

As a business matter germain to the absolute necessity of some rustling being done in obtaining an increase of membership of our State Association. The list of membership of most prosperous State Societies numbers from five hundred to two thousand members, while ours for the year 1889 only numbers fifty-one annual and forty-nine life members.

The following statement will give the present status to date of the financial condition of our treasury. For a detailed statement, a reference is made to the cash book and records of the Association.

ALEX SHAW,
Secretary.

PRUNING FRUIT TREES.

BY HON. SAMUEL WADE.

Mr. President, Ladies and Gentlemen:

That a subject of this kind should be introduced for discussion in a convention of intelligent, practical fruit-growers, at this time and place, seems to indicate an earnest desire in the minds of farmers of the different fruit sections of this State to become better acquainted with the different methods of tree training, that they

may select therefrom that system which seems the most congenial to healthful tree life and that which will promote the happiest result in fruit growth.

I train my fruit trees to low heads. Therefore, in order to head a tree low, with a beautiful and symmetrical head, I begin the training when very young. First year, from bud or graft, I train to a single whip or stem, and after buds start at one year old I procure a woollen cloth in hand with which I rub off all buds to eighteen or twenty inches from the ground, then cut back to five or six strong, healthy buds, going over my plantation two or three times during the growing season with the woollen cloth and rub off all superfluous buds that may have started upon the trunk of the young trees. By careful observance, at the end of two years we have a beautiful, well-branched tree, with four to six uniform branches. After this my system is to remove all superfluous twigs and branches and not let the interior of the head get so thick as to obstruct the free admission of sunlight and air, and if the tree is of a towering habit, as the Tetoffsky, Reswicks, Red June and that class, I prune to the outer bud in cutting back in order to incline the tree to a more spreading habit. But if the tree is of a spreading habit, as the Ben Davis, Tallman's Sweet and that class of trees, I prune to the inner bud that the tree may be inclined to grow more compact, as this class of trees will, after fruiting, be inclined to spread full well.

I strive to do my heavy pruning while the tree is young. Always avoid rash cutting of fruit wood, as such a habit always tends to create diseased wood and inferior fruit; but if it becomes absolutely necessary to do heavy cutting, I do it with a sharp pruning knife and cover the wound with warm wax within two days after severing the limb.

Never, under any circumstances, allow a fruit tree to become forked. If there are two equal branches to a young tree, sever one of them by all means and thus save your tree from destruction at a time when you will most feel the loss.

A sharp, intelligent knife is the most useful tool a farmer can use upon his fruit trees. With it keep off all superfluous growth while the twigs are young. Do the principal pruning in April and May, but keep off superfluous growth at any time till in August, after which prune no more till April, except to remove water sprouts or sprouts from the root. I prefer to remove these in the latter part of September and October by removing the soil to the parts where the sprout has grown from the root, cleaving it off from the root with a sharp chisel, covering up the roots as before to callous and heal, not being so liable to sprout again as when the sap is running.

WEDNESDAY, October 2, 1889, 10 a. m.

W. B. FELTON in the chair.

The forenoon was spent in the discussion of subjects germane to Horticulture in general, and report of Committee on Awards. The specific report of the Committee on Awards will be indicated by the proceedings of the Executive Committee, as follows:

CANON CITY, October 2.

Executive Committee met on call of Secretary.

Present: W. B. FELTON, JOHN TOBIAS, DAVID BROTHERS and ALEX. SHAW.

W. B. FELTON in the chair.

W. B. FELTON, as President of Fremont County Horticultural Society, paid to the Treasurer of this Associa-

tion \$38.00, the amount in excess of appropriation to pay premiums at Cañon City exhibition.

The following persons were appointed Committee on Awards: GEORGE WESTLAKE, Denver; L. K. PERIN, Denver, and WM. B. UPTON, Montrose.

The Committee on Awards reported the following as being entitled to premiums, and warrants were ordered drawn on Treasurer for their payment:

| | |
|---|----------------|
| Delta County Horticultural Society (by S. Wade), Warrant No. 26— | |
| Second premium, best and largest display of Fruits by any county in Colorado | \$15 00 |
| Third premium, best and largest display of Apples by any county in Colorado | 5 00 |
| First premium, best and largest display of Grapes by any county in Colorado | 10 00 |
| Second premium, best and largest display of Stoned Fruits by any county in Colorado | 5 00 |
| Total | <u>\$35 00</u> |
| Samuel Wade, Warrant No. 27— | |
| First premium, best and largest number of varieties of Apples grown by one person | \$20 00 |
| Best collection of Grapes grown by one person | 10 00 |
| Total | <u>\$30 00</u> |
| W. S. Coburn, Warrant No. 28— | |
| Best collection of Pears grown by one person | \$ 5 00 |
| F. E. Bird, Warrant No. 29— | |
| Best plate of Apples, any variety | 2 00 |
| A. D. Cooper, Warrant No. 30— | |
| Best plate of Peaches, any variety | 1 00 |
| A. A. Ireland, Warrant No. 31— | |
| Best plate of Pears, any variety | 1 00 |
| John Gravestock, Warrant No. 32— | |
| Best collection of Plums | 5 00 |
| W. B. Felton, Warrant No. 33— | |
| Third premium, best and largest number of varieties of Apples grown by one person | 10 00 |
| Best collection of Pears | 10 00 |
| Best plate Quinces, any variety | 1 00 |
| Total | <u>\$21 00</u> |

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| | |
|--|---------|
| Fremont County Horticultural Society (by Felton) Warrant No. 34— | |
| First premium, best and largest display of Fruits by any county in Colorado | \$25 00 |
| First premium, best and largest display of Apples by any county in Colorado | 15 00 |
| First premium, best and largest display of Pears by any county in Colorado | 10 00 |
| Second premium, best and largest display of Grapes by any county in Colorado | 5 00 |
| First premium, best and largest display of Stoned Fruits by any county in Colorado | 10 00 |
| Total | \$65 00 |

| | |
|---|---------|
| John Briery, Warrant No. 35— | |
| Second premium, best collection of Grapes grown by one person | \$ 5 00 |

| | |
|--|------|
| Eugene Weston, Warrant No. 36— | |
| Best plate of Plums, any variety | 1 00 |

| | |
|---|------|
| W. C. Catlin, Warrant No. 37— | |
| Best five varieties of Apples for quality | 5 00 |

| | |
|--|-------|
| Jesse Frazer, Warrant No. 38— | |
| Second premium, best and largest number of varieties of Apples grown by one person | 15 00 |

| | |
|---|------|
| Mrs. Paul Ross, Warrant No. 39— | |
| Best single variety of Grapes | 1 00 |

| | |
|--|---------|
| Jefferson County (by J. Tobias), Warrant No. 40— | |
| Third premium, best and largest display of Fruits by any county in Colorado | 10 00 |
| Second premium, best and largest display of Apples by any county in Colorado | 10 00 |
| Total | \$20 00 |

| | |
|---|---------|
| R. W. Shropshire (by S. E. Land), Warrant No. 41— | |
| Best five winter varieties of Apples | \$ 5 00 |

| | |
|---|---------|
| A. M. Olds (by S. E. Land), Warrant No. 42— | |
| Best collection of Peaches | 5 00 |
| Best five varieties of Grapes grown by one person | 3 00 |
| Total | \$ 8 00 |

Mesa County (by S. E. Land), Warrant No. 43—

Second premium, best and largest display of Pears by any
county in Colorado \$ 5 00

W. H. Coffman (by S. E. Land), Warrant No. 44—

Best five Fall varieties of Apples 5 00

John Pierce, Warrant No 45—

Best three varieties of Apples for Commercial use 3 00

Adjourned.

THE GRAPE.

BY W. A. HELM.

The fruit of all fruits, and where is there a country better adapted to the cultivation and growing of the grape than the foot-hills and immediate valleys of the Rocky Mountains? We have loam, sandy and clay soils, all of which are well adapted to some of the varieties of grapes. The soil is deep, rich and fertile; climate dry, just what is needed to make them the highest and finest flavored grapes grown. I think the sandy or gravely sub-soils the best of all kinds. I think our foot-hills will, in the near future, where water can be applied, be the home of the grape. I know but little of the classification of the grape, therefore, of this I will say nothing. Most all of our American grapes are the offspring of the Fox, or wild grapes. Our best are direct from the seed of the Concord, some few from the Catawba; most are black, more or less foxy, strong, vigorous growers, hardy, standing the hardest or coldest winters we have. Late warm falls are more injurious than are winters. Leaves course and heavy, rusty on under side, less liable to the attacks of injurious insects, of which the leaf-hopper is the most dreaded, and of which I will speak later.

As to varieties for profit I think six or seven enough. First, Concord and Worden Black; second, Brighton, Salem, Goethe Red and Niagara Fur White. For a wine grape Virginia Seedling is as good as any; one or two other kinds are good. To make grapes more profitable it will not be long before many of the wine varieties will be planted. Then if the Legislature of Colorado should see fit to enact some stringent prohibition law, then some would be left. From what she done last winter she is liable to do most anything. Some are crying already, "We will have no market." With our non-producers in the mountains, cities and villages, I think we have the best market in the world, and it will all the time increase as fruit gets more plenty and cheaper. Everybody will buy a basket where they now and then buy but a pound. Of course it seems very hard for the old growers who have been getting from seventy-five cents to one dollar and twenty-five cents per basket, to think of selling for forty or fifty cents, but less will pay. Of course some will become discouraged at low prices, insects, etc., but this will make no difference, planting will go right along.

Persons wishing to set vines, and not fully satisfied as what to set, could not do better than to visit the different vineyards of Colorado, see and taste, then choose.

Send your orders to good and reliable nurseries. Trust no peddlers, unless they can show that they are doing business for such houses, and in all cases take a guarantee. Never leave them to choose for you if you don't want to get left. We have several grapes that have been thrust upon us by smooth, slick-talking peddlers, one in particular, the Elvira, as you all know, is worthless.

The grapevine, being both useful and ornamental, bears in Colorado the second year, everything being

favorable. Of course you cannot expect much of a crop under three years, dry upland being preferable to low or wet subsoil. Irrigation, of course, is necessary in Colorado on any soil suitable for grapes. Grow as dry as possible for sweet, good-flavored grapes. For large, showy grapes give plenty of water.

Vine and grapes do not mildew in Colorado as in many portions of the older States.

New ground is much preferred to old. Plow deep.

You cannot work the ground too much in the preparation for setting. Some dig holes. I think deep-plowed furrows better. I think 7x10 the most desirable distance apart for rows. There is room then for working, manuring and gathering. Set deeper in sandy than clay soils. Plant as early as the middle of March if you are ready. As a rule most any land is wet enough that early. The first summer pull off all canes but one; let grow on the ground; trim no more until fall, then cut to one or two eyes. It is not necessary to stake a vine the second year.

Good cultivation is necessary at all times. It keeps weeds and grass down. It also causes the vine roots to run deeper and is less liable to dry out. Most all grape-growers are afraid to trim, or don't know how. Too much wood—small grapes. Trimming is a business that should be better understood.

I notice some of our growers about *here* leave too many vines grow from one root. Two are enough, unless you want many and small grapes. A few good large bunches and berries are better than many small ones. The best time for fall pruning is not later than December 1; for summer pruning while the wood is soft.

Much summer pruning not good; never cut the leaves off or trim to expose the grapes to the sun, this will only

spoil them, also prevent ripening. Grapes to be nice and good should ripen in the shade of their own leaves. As to raising foreign (or California as we call them here) I think but little of it; too much trouble; I want nothing that has to be buried in winter. You can not get any more in the market for the best California than the Concord, and the California are much more liable to the attacks of all kinds of insects and enemies of the vine, which are many.

We read, I think in the bible, of two men going on a tramp looking for a new country. They returned with the finest wild grapes known. Of course they were not familiar with the variety, but I am satisfied it was the Concord, the parent of our best. This being over two thousand years since not many of us knew much of grape raising at that time. Five or six years ago I set six hundred California vines, ten varieties; two years later I plowed all up, believing they were infected with the phylloxera; would not have done so for anything if I could have helped it. Hence this pest in Colorado. But some of my neighbors who did not wish to see it as I did, went on raising and selling vines infected the same as mine. Of course if we had this pest it is now pretty well distributed over Colorado. I hope I was mistaken. If they should get a hold in Colorado those having the California varieties will suffer the most. The leaf-hopper is very disastrous to these vines, much more so than to most of our American vines. The best time to fight the leaf-hopper is in the fall, late; rake all leaves and rubbish together and burn. Of course if it could be burned under and at the root of the vine it would be much more effectual, but would injure the vine. Spring spraying with tobacco water is said to be good. I think a better way is to take muslin a yard wide, spread with petroleum tar, lay under or along one

side, and have some one on the opposite side scare the hopper, and this will catch them by the million. These are a pest much to be dreaded, but what is it we raise don't have its enemies? Had they none our crops would be so great they would not be worth harvesting.

Now, in conclusion, I would say plant grapes. Of this subject I will say no more, but will be glad to hear from more experienced growers, and their experience with the vine.

HORTICULTURE FOR THE FARM.

BY J. H. HARRISON, CAÑON CITY.

It has been thoroughly demonstrated that all varieties of fruits grown in this latitude are produced with unusual success all over our State, outside of the higher altitudes, and that our fruits and vegetables are greatly superior in flavor and quality to those grown in other localities where a system of irrigation is not used and can not be practicably adopted.

That we are without a rival in our Horticultural capabilities, as shown at our Horticultural and State Fair exhibits in this State, and when exhibited in the Eastern cities and coming in competition with the fruits and vegetables of other localities, is very generally conceded, hence it is that with our superior advantages in this industry, and in consideration of the profits arising therefrom, we would urge the farmers of our State to devote a portion of their time to the cultivation of fruit trees, vines and the smaller fruits, and the planting of shade and ornamental trees, thus making pleasant and attractive homes, adding to the beauty of their farms and making them more desirable places of abode.

The impression seems to prevail among many farmers, not only in this State, but in others also, that the planting and cultivation of an orchard and the ornamentation of their homes with shade trees, shrubs and flowers, are costly and useless appendages, requiring considerable outlay of money and labor without adequate returns for the expenditure. This, we think, is an erroneous conclusion and only entertained by those who have not made the experiment. It should be apparent to every farmer that it is as important to raise his own fruits and vegetables as to grow the hay and corn consumed on the farm, and much more essential to the pleasure and healthfulness of his family, for if not so raised the probabilities are they are consumed in very small quantities by those dependent on his support. The labor required in the cultivation of a small orchard upon the farm can be given at such times when other work is not pressing. Care and attention of a few hours, at proper intervals, is all that will be required to make it a success, and in after years such forethought will be commended and the results attained most gratifying. The writer has for a number of years cultivated an orchard and vineyard in connection with his farming interests and finds the combination has been most profitable, not only in the sale of fruits produced, but in the greatly enhanced value of the entire farm as a result of its greater attractions.

Colorado is visited yearly by great numbers of tourists, pleasure and health seekers from the East. Our many treeless farms are most noticeable to them and creates the impression that the farmers of our State lack the thrift and energy of their Eastern brethren—simply because proper attention is not given to the planting and cultivation of trees which add so greatly to the attractiveness of country landscape; especially to our State. Our farmers, however, are beginning to realize the im-

portance of these things and are awakening to the profits and advantages of Horticulture and Forestry. We predict that in a few years our plains and valleys will be dotted over with model farms attracting the admiration of our Eastern friends and visitors; then it will be that the tourist and invalid may enjoy to a greater degree the healthfulness of our climate, the grandeur of our mountains, and eat of the fruits of our land and rest content among us.

The most beautiful and renowned gardens of the world have been grown under a system of irrigation, as in the famed Valley of the Nile, on the hills and plains of Palestine, on the borders of the Tigris and Euphrates, all supporting a dense population and magnificent cities. With similar advantages of climate and soil it is possible for us to surpass them all, and we predict the time will come when the now partially barren plains of the West will be the garden spot of America, and that they, with the mountains and fields of mineral intersecting them will sustain a population equal in numbers to the States east of the Mississippi.

FRUIT GROWING IN COLORADO--INSECTS AND INSECTICIDES AND SUB-IRRIGATION.

BY JOHN GRAVESTOCK, CAÑON CITY.

When I first began to grow fruits in Colorado I had full confidence that it could be accomplished, although nine out of every ten said it was useless to attempt it, as Colorado was no fruit country. But what do we see to-day? We see as fine a fruit country as there is in the United States; I might go a little farther, and say the finest. I have sometimes come across strangers in Colorado who ask, "What kind of fruit can you grow here?" Any

kind, I tell them, except some tropical fruits, and some of them by laying down and covering slightly for the winter. Name what kinds of fruit you can raise, say they. Well, apples of every variety, pears the same; then cherries, plums, apricots, peaches, nectarines, gooseberries, currants, raspberries, strawberries, blackberries and grapes. But, say they, can you raise the tender varieties of grapes? Certainly we can, just as well as we can the old Concord. To convince you, just come this way and I will show you. You see that row of twenty-four vines? Well, they are the California Chasselas and are five years old from the cutting. How many pounds of grapes do you guess there are on that row of twenty-four vines?

"Well," says he, "I should guess them at two hundred pounds."

I told him there was all of five hundred pounds on that row of vines. (When we gathered them we had near five hundred and fifty pounds).

"Come this way and I will show you other California varieties. There is the Muscatel (nine years old) that has on more than one hundred pounds of fruit. Near is a Muscat of Alexander with some clusters that will turn the scales at two pounds. Here is the old Mission grape, as you see, loaded down.

"Well," says this stranger, "it is astonishing. I can scarcely credit my own eyes. To look round on these prairies, where there seems to be scarcely enough grass to keep a rabbit alive, and then look at your grapevines and fruit trees. It is astonishing. But seeing is believing. How do you manage your trees and vines?"

"Prune and water moderately and cultivate thoroughly. I lay down my tender grapevines in the fall as soon as pruned and cover them with two or three inches of earth. That is all there is about it."

This is a conversation that actually took place in my orchard last summer.

As to insects, I find the older our orchards and vineyards get the more insect pests we have to fight. There are three kinds of insects that are at present our greatest scourge, namely: the codlin moth, grape-leaf hopper and the grape and apple flea-beetle. A long paper could be written on each one.

All I can do in this paper is to give each a passing notice, with remedies I have used for their destruction. The codlin moth is certainly the greatest pest we have to contend with in our apple orchards. (Now for the fight.) As soon as the blossom falls from the trees, I have my spraying machine in readiness, which is the Little Giant, manufactured by the Nixon Nozzle & Machine Co., of Dayton, Ohio, which for lightness and convenience and effect can't be beat. With this I use the Climax Poison, manufactured by the same company, using half a pound of poison in forty gallons of water. The fruit is now about the size of peas. I have one man along to pump and pull along machine, while I handle the hose. We can mix poison, fill machine and spray one hundred trees, thoroughly wetting every leaf, in about two hours—trees from ten to twenty feet high. This answers for two weeks, or until the apples get as large as hazel nuts, when I give them another spraying. In about another two weeks, when the apples are about the size of walnuts, I give them the last spraying, making three sprayings in all. This method I have used for the last two seasons with the best results, as I never found one wormy apple in all my summer and early fall varieties.

Some say we have only two broods of the codlin moth a year, but I feel positive from my last year's ex-

perience that we in Colorado have three broods, and the last brood from the middle to the end of August.

Another good remedy is lanterns at night. These may be fixed as follows: Get three stakes, say ten feet long; wire them together at the top; spread out the bottom ends, angle shaped, about four feet apart; let them into the ground a few inches to keep solid; about five feet from the ground nail slats around on the outside, or twist a No. 11 wire around, keeping it level; on this lay a board for standing the pan upon (a common six-quart milk pan will do); fill your pan to within an inch of the top with water, and pour in a small quantity of coal oil, enough to spread over the top of the water; make a nook of No. 11 wire to hang your lantern on, which you can fasten to the top of the stakes, letting the lantern just touch the oil in the pan; it is well to twist a wire around two of the stakes and make a nook at the ends to fix on the sides of the lantern, which will keep the wind from blowing the lantern about; then light.

I have caught in one pan in one night fifty codlin moths. This was after it was too late to spray apple trees with poison. I kept my lanterns going up to the first of August. At that time I caught no more codlin moths with lanterns, and thought they were all done for for the season. About the middle of August I gave my fruit another looking over to make sure I had no wormy apples. Judge of my surprise when I found dozens of apples with the worms just eating into them, and after all my trouble one-third of my winter apples were wormy, and many of my late fall.

So I have come to the conclusion that we have had three broods of the codlin moth this season, out in this part of Colorado.

Well, I thought I would not be beat; I would catch them anyway. So I tied bands of burlap around my trees thinking I would trap the worms, and by this method I have caught thousands. This I followed up, up to the end of September, when I thought I had caught them about all, and left the bands on the trees. At the end of October my curiosity led me to take another look at the bandages. Judge of my surprise when under the first bandage I found by actual count one hundred and forty-one worms; and by taking all the bandages off I must have found at least a full quart of worms. I have not found any worms since.

THE GRAPE LEAF HOPPER.

This has been the greatest pest we have had to contend with this season among our grapes; it is a small little bit of a brown looking fly (and acts something like Paddy's flea, when you put your finger on him he is not there). This insect begins to show itself about the beginning of May, at the base of the vine, and if not checked right off as soon as the vine leaves begin to open it will commence its course of destruction, beginning at the under side of the leaf—next the stalk; in a few days the leaves will begin to turn brown and look as if scalded; if left alone it will breed as many as four or five different broods in a season and no fruit will ever ripen, but as soon as the grapes are about to change color the fruit will all shrivel up on the vine and become perfectly worthless, and the vine will drop all its leaves by the middle to end of September, leaving the fruit all on the vine shriveled up.

Remedies—I have tried several, but none so good as a good strong decoction of tobacco water. Take twenty pounds of tobacco stems, place them in a barrel, fill the barrel with soft water, let it stand for twenty-four to thirty-six hours, occasionally giving it a good stirring

up; put a board on the top—inside of the barrel—weighted down with a rock, to keep tobacco under the water. This will make about forty gallons of good, strong liquid. When you are ready to use it get a large wash-tub and lay across two or three slats; on these slats lay one thickness of burlap; take out your tobacco stems with a manure fork and lay them on the burlap to drain; empty your barrel by straining it into your spraying machine and spray it onto your vines with a good force (here comes in good play the Little Giant spraying machine).

Now look back under your vines and you will see the hoppers lying dead by the thousands if you have let them get a little ahead of you. Repeat this about once a week as long as you see any hoppers about, and I guarantee you a good crop of grapes, if you have got good healthy vines. I saved thousands of pounds of grapes last season by this method. This is no hear-say, but practical experience.

It will be well here to mention remedies I have tried, but without success: (First) Dusting with caustic lime; (second) lime and ashes; (third) lime and soot; (fourth) clear soot when leaves of vines were damp; (fifth) decoction made by boiling cedar boughs; this they seemed to enjoy hugely; (sixth) coal oil emulsion, made by dissolving one pound of whale oil soap in a gallon of water and while hot stirring into the soap one gallon of coal oil; after this was thoroughly united stirred it into thirty gallons of water and sprayed on with great force; this last method only seemed to stupefy them for a short time; after half an hour they were as lively as ever; (seventh) California Insect powder dusted on; this killed them, but it is too expensive. Tobacco decoction takes the cake above all I have tried.

This insect commences on the tender varieties of grapes first, but if left alone will spread to all the hardier varieties in the vineyard in a short time, doing just as much damage to them. It is also a good idea to clear up all leaves, trimmings and other rubbish in the fall and burn, leaving the surface perfectly clean for the winter, as this insect makes its winter quarters under all kinds of trash. No kind of cold weather seems to affect it through the winter. I have done this for the last two seasons, and, I think with good effect.

THE GRAPE AND APPLE FLEA BEETLE.

This is an insect easily kept in check by proper remedies. It generally makes its appearance about the end of May or beginning of June. It is a small, steel-blue beetle, about one-third the size of the ladybird beetle. It makes its appearance first among certain weeds. Especially will you find it among young cockle burs. It is a lively little fellow, easiest approached very early in the morning before sun up. If there are no weeds for it to work upon you will find it on young grape vines or young apple stock. If not checked at once it is astonishing what an amount of damage they will do in one day. I have seen whole vines and young trees perfectly stripped of their leaves in a few hours by this little pest.

Remedies—I use with perfect success one-half pound of Climax Poison to forty gallons of water. (London purple will do as well.) This is thrown on with the Little Giant spraying machine with great force, and will dislodge every beetle at short notice. Perhaps another fresh lot will come in in a day or two. If they do and settle on the vines and trees that have been sprayed they will soon fall under the vines dead. One good spraying will be sufficient for five or six days.

SUB-IRRIGATION.

This method, after another year's trial, takes the cake over all other methods of irrigation. This is the fifth season I have tried it and it is a grand success. Both trees and vines this year have yielded a splendid crop of fruit for being so young. I see they have been discussing sub-irrigation at Boulder, and have come to the conclusion that it will cost from six hundred to a thousand dollars an acre. For the life of me I can not see how they are going to make it cost that amount. Why, for sub-irrigating orchard or vineyard by the cement pipe system it would not cost, at most, over one hundred dollars an acre, and could be done for much less. I see again, they have been trying to sub-irrigate with a four inch wooden pipe, and found the second season something wrong, and after being taken up found the pipe full of moss. Why, gentlemen, that moss had never any business to have been let into that pipe, and besides a two-inch cement pipe is plenty large enough to use as laterals to irrigate from. I have a thousand feet of two-inch pipe that has been down five years, and done splendid work every season since, and to-day is as clear and nice as it was the first day it was laid down, and I expect it will last much longer than I shall, if I live another fifty years.

MR. COLE is right in saying that sub-irrigation will yet be a success. I will say to MR. COLE it is already a grand success on a small scale, and why can not it be made so on a larger scale? I don't quite agree with friend BROTHERS in leaving the experiment for young men to work out, as MR. BROTHERS is just the man to help put this method through if he would lay hold of it in earnest. If I had had the good fortune to have been at home last October, when friend BROTHERS was over on my little place, I could have shown him in five:

minutes what sub-irrigation would do that would have surprised him. If the people at Boulder are thinking of sub-irrigating with short lengths of terra cotta pipe, I will say right here they can't do it, as it will discharge water too fast if they only have one loose joint every rod. The hole in the plug of the cement pipe for discharging water is no larger than a common sewing needle, and with a fall of four feet in three hundred, if left too long, will discharge too much water. A cheaper and more substantial pipe for sub-irrigation can not be made than with the best English Portland cement, as one barrel will make two hundred and fifty feet of good two-inch pipe, and three good men and a boy will make and lay from twelve to fifteen hundred feet per day.

Hold on, gentlemen, don't condemn sub-irrigation in any way until you have thoroughly tested it.

INSECTS AND INSECTICIDES.

BY PROF. CASSIDAY.

The cultivation of the large and small fruits in Colorado may now be said to be an established industry of considerable commercial importance to the State. The amateur who plants a city lot and the farmer with his broader acre are alike interested in making it a success. But the immunity hitherto enjoyed by us from insects and fungoid diseases may now be said to be at an end. The insects and plant diseases of older regions than ours are with us and in such quantity as to suggest the importance of intelligent and united effort to meet this new condition of things. They always impose a heavy tax upon the products of a man's labor and too often succeed in wresting from him the profits of a season's toil.

Injurious insects are now so universally distributed that there is no part of our continent where fruit culture can be carried on without some effort being made to subdue them. But it is also true that among these pests we have some friends and it is to the latter that nature has assigned the task of holding in subjection the destructive species. This they often do very effectively—sometimes by devouring the eggs and in others the bodies of their victims.

It is not uncommon, however, to note that the antipathy to all insect life is so great among us that these efficient allies are consigned to destruction. The necessary information by means of which the fruit grower could deal intelligently with this subject has not hitherto been accessible. But now the frequent reports of the Experiment Stations in the different States, written in popular language, has placed within reach the best information of trained observers in the various fruit growing regions of the Union, the result of which must prove an invaluable aid to the skillful and painstaking fruit grower. But these pests are not altogether an unmixed evil in fruit or vegetable culture. If no opportunities were offered for the industrious and skillful to excel in this line of human effort, the product of the orchard might suffer from the presence of a surplus. The presence of enemies and obstacles places a premium on the thoughtful, diligent application of the best known remedies in a prompt and efficient manner. Some of these remedies are the most efficient that the best experience of our time could devise and will, with certainty, accomplish the object intended and without injury to growing crops.

INSECT LIFE.

Insects begin life, either by being hatched from eggs or are produced alive by the female; usually they are hatched in the form known as maggots, caterpillars or

grubs. The eggs are deposited on, or near whatever may be the favorite food of the larvæ. Some insects insert their eggs in living vegetable matter, and to do so are provided with an egg laying apparatus, which consists of organs enclosing bristle-like saws, by means of which a puncture is made in the tissues of the plant in which the eggs are deposited. Usually insect eggs hatch soon after being laid, but often remain unhatched during winter or, indeed, they may remain unhatched for years. They can endure the most intense cold without injury. In a few cases insects are partly developed before birth, otherwise they pass their existence in their different conditions or stages successively. To the first stage the term larvæ is applied, meaning a mask, and signifies that the insect in this stage gives a mere idea of its perfect form. In this stage they are known as maggots, grubs or caterpillars and are active, voracious, and increase rapidly in size.

To the second stage the term pupa is applied, signifying an infant. In this stage some orders of insects are inactive and cannot feed as the chrysalis Butterfly Buttes Wasps—some are, however, active and voracious and increase rapidly in size. The third stage, the image, is that of the perfect insect of whatever kind. The word means the image, likeness or example of the perfect insect.

Time will permit but a brief notice of a few of the most important injurious insects of the past season in Northern Colorado. The most important of these is the Codlin Moth, one of the most troublesome insects the fruit-grower has to contend with, and, although of foreign origin, it is now found in almost all parts of the United States—occasioning an immense annual loss upon apple-growers. This insect, though so well known as a larvæ, is not familiar to many of our wisest fruit-growers. The

moth appears in this region about May 1; the female commencing to lay eggs in about ten days after the flowers have expanded.

Each moth is capable of laying not less than fifty eggs, but these are not all matured at once, and hence are deposited over a period of from one to fifteen days; added to which, too, is the fact that some of the moths are retarded in their development in the spring, which accounts for finding larvæ of various sizes at the same time. The eggs are deposited in the calyx or basin end of the apple. In a few instances they have been observed at the stalk end, and occasionally on the smooth surface of the cheek of the fruit. In about a week the egg hatches, and the worm at once begins to eat through the apple to the core. Its color is pinkish; more highly colored on the back, and covered with small elevated points, from each of which arises a fine hair. In three or four weeks the larvæ is matured, when the fruit falls prematurely to the ground, sometimes with the worm in them, but more commonly after it has escaped; when they at once find their way to the trunks of the trees, where, under the rough bark in a secluded place, they spin their cocoons. After this the change to the second stage is made in about three days, the early brood remaining in this condition about two weeks, when the matured moth escapes.

Remedies—The old method of bandaging the trunks failed, as it required attention in the busy season, which was neglected, and so the method was a failure. Another method that finds room in the papers each year is to attract these moths to liquids, sweet or sour, which are placed in vessels suspended in the trees. This remedy, like that of attracting these moths by fires, in which they will be burned, is entirely worthless.

The past eight years have demonstrated the value and safety of Paris Green and London Purple as a specific against the Codlin Moth. It is, if not the only way, certainly by far the cheapest and most practical way that we can conquer this pest and secure marketable fruit. We should never spray until the blossoms fall from the trees. To spray earlier endangers the bees and honey together, and is too early for the best results. One application will be enough in case there is no heavy rain. If a second application is necessary apply two weeks after the first.

The proportion of poison to the water used is important. London Purple is more injurious to the foliage than Paris Green, and white arsenic (arsenious acid) is more injurious than either. London Purple may be used on the apple, pear, plum and cherry.

Other important insects attacking the apple in Colorado are the apple-root plant louse, the flat-headed apple tree (*chry-sob-o-this-flm-or-a-ta*) borer, the oyster shell bark louse (*Mgtil aspis pomorum*), the apple tree flea beetle (*Graft odera foli*), and leaf hopper, an unnamed species peculiar to this region, the most important of which are the flat-headed apple tree louse borer and the flea beetle. The latter, however, confines its attacks to nursery stock or young trees. It readily succumbs to one or two applications of the arsenites.

BORERS.

There are two borers, the larvæ of which are especially troublesome to apple orchards. The flat-headed borer is the one commonly met with. The beetles appear in this region (Northern Colorado) early in June. They are three-eighths of an inch, flat and quite dark. They are quick in their movements and may be seen in the heat of the day taking in the sunshine upon the trunks of the trees. Eggs are deposited on the trunks

or large limbs, and soon hatch, when the worms eat through the bark into the sap-wood where they feed until the following season.

Remedies—The best remedy is prevention. If the trees are kept in a healthy, vigorous condition there will not be much need of remedies. If present they may be cut out with a pocket knife. Their presence is indicated by dark, dead-appearing spots on the bark. Washes are applied to the trunks to prevent egg laying and to destroy such as have been laid. A good wash is prepared by diluting soft soap with water until of the consistency of paint. Prof. Cork recommends the use of a little carbolic acid to the soap, but this should be used with caution, as it is liable to do too much damage if too strong. This is applied with a force-pump or brush. Mound-headed borer works in the sap wood and sometimes in heart woods.

ATTACKING THE PLUM.

Insects injurious to the plum in this State are the Plum-tree Sphinx (*Sphinx drupeferarum*), commonly known as one of the hummingbird moths; the Plum-tree Aphis (*Aphis prunifolia*), the Pear-tree Slug and the Plum Curculio. The Aphis infest the under side of the plum leaf, puncturing them and sucking their juices, causing them to become wrinkled and twisted.

Remedies—Spraying the trees about the time the buds are bursting with strong soap suds, weak lye or tobacco water, it will destroy most of them.

THE PEAR TREE SLUG

Is known to be destructive to the pear, cherry, quince and plum annually, for a number of years. The mature insect is known as one of the Saw Flies because the flenae of most of the species are provided with a saw-like appendage at the end of the body by which slits

are made in the bases of the plants on which the larvæ feed and in which the eggs are placed. The larvæ resemble a tadpole in form, blackish or olive brown in color and has a disagreeable odor. Fruit growers should be on the lookout for this pest about the middle of June and again early in August, as they soon make trees look as if scorched by fire when the leaves, as a result, drop. In such cases the trees throw out new leaves, but the effort is so exhausting as to injure the ability of the tree to fruit the following season.

Remedies—Hellebore, a vegetable poison, mixed with water in the proportion of an ounce to a gallon of water, applied to the foliage, destroys this slug.

THE PLUM CURCULIO

Is the chief enemy of the plum in most of the States, although it hasn't come under my notice as being very injurious as yet in this State.

PLUM POCKETS.

During the past summer a disease appeared on the latest plum and on some varieties of the Chickasaw species, which is commonly attributed to insect life and known as Plum Pockets. It is not, however, the work of insects, but is due to the presence of a parasitic fungus, which attacks the young fruit and by its growth within their tissues causes the "pockets." This disease was first discovered by Fuckel, in 1861, a European mycologist. The "pockets" appear soon after the flowers have fallen, attain full size and drop from the tree early in July. The diseased fruit is readily recognized even when young, by their smoothness and pale yellow, or reddish color. As they grow older they become gray and black, successively, and rather like bladders when brought in contact with any hard substance. A section through the fruit would show the moths to be quite

thick, the absence of the stone and the center filled with the threads of the fungus. All species of the plum are subject to this disease, but it is particularly injurious to the red and purple varieties. A tree that has once borne these malformations will, as a rule, continue to be on them.

Remedy—The treatment suggested by the facts in the case is the cutting out of the affected parts before the "pockets" have matured, and well below the affected portion, as the mycelium of the fungus may live in the tree from one season to another.

INSECTS INJURIOUS TO THE GRAPE.

In Northern Colorado are the Achemon Sphinx, occurring all over the United States, but not often in sufficient numbers to be very injurious. The Eight Spotted Fous-ter, is also very generally distributed over the United States. The moth is readily recognized by its deep blue-black color, and with two large, pale yellow spots on each of the wings and two white spots on each of the hind wings. The larvæ may be subdued by the wet preparation of Paris Green, or Hellebore, as already described. The Grape Vine Flea Buth is a well known pest to grape growers in the month of June. It is readily subjected by the use of arsenites. The Grape Vine Leaf-Hopper is an equally well known native insect. These insects pass the winter in the perfect state, under leaves and other rubbish, becoming active in the spring, when they deposit their eggs on the young leaves of the vine. The leaves are often so much weakened that they drop, hence the fruit fails to ripen. As the insect enters the second stage of its existence, corresponding to the chrysalis state, in others it acquires wings, making it extremely difficult to combat. The Clinton, Delaware and other thin leaved varieties suffer more from the attacks than do the thick leaved varieties, as the Concord.

Remedies—Various measures have been suggested as remedies. It can not be effected by the arsenites, as it does not eat the outer surface of the leaf. But kerosene wherever faithfully applied and prepared will destroy them in large numbers. As a preventive, the soil in the vineyard should be kept clean and several times raked in autumn or early spring, so as to expose the concealed insects to the action of frost. Some seasons they are present in great numbers and comparatively scarce the next, their preservation depending so much on favorable weather and suitable shelter for the perfect insects.

RASPBERRY.

Attacking the raspberry we have the Wasp Saw Fly. This insect is readily destroyed by syringing the bushes with water in which powdered Hellebore has been mixed, in the proportion of an ounce to a pailful of water.

INSECTICIDES AND APPARATUS FOR APPLYING THEM.

Paris Green and London Purple are the most effective of all insecticides for the destruction of such insects as eat the outer surfaces of plants. The poisonous principle in them is arsenic, of which Paris Green contains 57 per cent. and London Purple 47 per cent. A given bulk of the former is double the weight of the latter.

HOW APPLIED.

When applied dry they are diluted one part of the poison in fifteen to twenty parts of flour or plaster. This may be applied to small plants in a muslin bag or with a bellows. Dry applications should be made early in the morning or after a storm. Wet applications should not be used stronger than one pound to one hundred and sixty gallons of water, or weaker than one pound to one hundred and twenty gallons. In a smaller way one ounce to ten gallons in the former, and one ounce to eight gallons in the latter. The arsenites are invaluable

against the various leaf-eating insects, as Flea Beetles, Cucumber Beetles, the Cabbage Worms, before the plants begin to head, the Codlin Moth and Curculio. The wet application should be instantly stirred to prevent the poison settling. London Purple being lighter, remains longer in suspension.

Hellebore is a vegetable poison which kills by being taken into the stomach. It is sometimes substituted for the arsenites as being less dangerous. It is less effective, however, but is a reliable remedy against the larvæ of Saw Flies—as the Cherry and Plum Slug, Currant Worm, Raspberry Worm and others. It may be applied dry, diluted with five to ten parts of flour, and dusted on the plants affected. Applied in the wet way it should be mixed with water in the proportion of one ounce to a gallon. How large an amount of this poison is required to kill a man is not accurately known, but it is known that a tablespoonful has been taken without causing death.

Pyrethrum is obtained by grinding the florum of two species of plants belonging to the germs Pyrethrum. To procure pure it should be purchased from the manufacturers or a reliable drug store. This powder kills by contact only. It is much more effective when applied dry and in the early morning when the dew is still on the leaves. This remedy is especially effective against soft bodied insects that are not protected by hairs, as the Cabbage Worm and Plant Lice.

KEROSENE EMULSION.

This insecticide, like the last, kills by contact only. Kerosene in its pure state is harmless to some plants while it is fatal to others. The emulsion is made by dissolving half pound of soap in one gallon of water by heating it to boiling point; remove from the fire when boiling and add two gallons of kerosene, churning the

whole violently with a syringe or pump until the materials have assumed a frothy mass. The emulsion is then diluted, using one part of the latter to twelve parts of water. This insecticide is invaluable for the destruction of the Apple and Grape Leaf Hoppers and all suckorial insects. Just how strong the emulsion should be in any given case can be best determined by trial.

SPAYING APPARATUS.

A number of firms in various parts of the country are manufacturing apparatus for the application of insecticides. Most of them are yet too expensive. There is need still of a cheap, substantial pump and spraying apparatus within the reach of all. For a small pump, the one manufactured by Lewis & Cowles, Catskill, N. Y., is good where but a small amount is to be done. It costs \$6, made of brass. For extensive spraying the Victor pump does excellent work and all by horse power. This machine will spray one side of a row of apple trees as fast as a horse can walk. For the best nozzle with this pump I should get the Graduating Spray Nozzle in preference to the "Boss."

HALL OF REAL ESTATE EXCHANGE, DENVER, January 9, 1890. }

The annual meeting of association was called to order at 10 o'clock a. m., PRESIDENT FAUROT in the chair.

The following was announced as programme of this meeting:

PROGRAMME.

THURSDAY, 10 A. M.

1. Meeting called to order.
2. Secretary's annual report.
3. Treasurer's report.

HORTICULTURAL AND FORESTRY ASSOCIATION. 397

2 O'CLOCK P. M.

4. President's address.
5. Obituary notice, and proceedings thereon, of Prof. Cassida, Agricultural College.
6. *a* Reports of standing committees.
b Report of county and district societies.

EVENING MEETING.

7. Orchard culture; details of preparation, exposure, soil, pruning, kinds to plant, with reference to profit and quality.

FRIDAY, 10 A. M.

8. The adaptation of Colorado as a fruit-growing State.
9. Colorado's fruit show at Chicago Exposition, 1889.
10. Ornamentation of school houses and grounds.
11. Horticultural text books for use in common schools.

2 O'CLOCK P. M.

12. Election of officers for 1890.
13. Strawberries; culture and diseases incident thereto; also raspberries and blackberries.
14. Insects and insecticides.

EVENING, 7:30 P. M.

15. The commercial outlook of fruit-growing in Colorado, and appliances for marketing to profit.
16. The status of experimental forestry and horticulture as connected with Colorado's experimental stations.
17. The special adaptation of Western and Southwestern Colorado for grapes and stone fruits.

SATURDAY, 10 A. M.

18. Market gardening and root crops for profit and quality.
19. Forestry and culture of timber for economic use, and such trees as may be grown for profit.
20. Floriculture for pleasure and profit.
21. Miscellaneous and unfinished business.
22. Appointment of standing committees and nomenclature of fruits.

A general invitation is extended to all lovers of horticulture and forestry, whether members of our association, citizens of our State, or otherwise, to join in the discussion of the preceding topics, either by written essays or oral discussion. Topics will not be specially assigned, but free for all to talk or write in a short, practical and concise way.

Secretary read his annual report of the doings of the association for the past year, as follows:

Mr. President:

Happily for our Association, we meet under more favorable auspices than heretofore. The question as to our legal status has been judiciously determined by the highest court of our State, and we are decreed to be a State institution within the true intent and meaning of our State Constitution.

Our last Legislature, by two distinct enactments, has made provision for our financial aid from the State treasury. One act, entitled "An act for the relief of the Colorado State Horticultural and Forestry Association," makes an appropriation of \$1,000. The regular appropriation was made in pursuance of law as enacted in 1888, for \$2,000; \$1,000 of this was made available for the year 1889, and \$1,000 for the year 1890. The two \$1,000 appropriations have been drawn by us from the State Treasurer, and disbursed as shown by the following statement of account kept by the Secretary with our Treasurer.

SECRETARY'S REPORT OF RECEIPTS AND DISBURSEMENTS, 1889.

RECEIPTS.

| | |
|---|------------|
| April 8, Special appropriation by Legislature for relief of Association | \$1,000 00 |
| Annual State appropriation, 1889 | 1,000 00 |
| Oct. 2, Contribution Fremont County Horticultural Society to pay on premiums, Cañon City Exhibition | 38 00 |
| Total | \$2,038 00 |

DISBURSEMENTS.

| | | |
|-----------|---|-----------|
| April 8, | Warrant No. 1, A. Shaw, Secretary, salary 1888 | \$ 400 00 |
| | Warrant No. 2, N. Millett, Secretary, salary 1886-7 | 300 00 |
| April 9, | Warrant No. 3, C. S. Faurot, printing letter heads | 5 00 |
| April 10, | Warrant No. 4, J. M. Clark, Association note and interest | 185 70 |
| April 15, | Warrant No. 5, A. Shaw, Secretary, contingent expenses | 25 00 |
| May 20, | Warrant No. 6, C. S. Faurot, attendance executive committee | 10 85 |
| | Warrant No. 7, David Brothers, attendance executive committee | 6 00 |
| | Warrant No. 8, John Tobias, attendance executive committee | 6 00 |
| | Warrant No. 9, Wm. Davis, attendance executive committee | 2 50 |
| | Warrant No. 10, W. B. Felton, attendance executive committee | 11 00 |
| June 20, | Warrant No. 11, John Brierly, premium Boulder exhibit | 32 00 |
| | Warrant No. 12, Ed. Hubbard, premium Boulder exhibit | 20 00 |
| | Warrant No. 13, Mrs. A. Gallup, premium Boulder exhibit | 10 00 |
| | Warrant No. 14, J. S. Ibbison, premium Boulder exhibit | 1 00 |
| | Warrant No. 15, Chas. Wilmore, premium Boulder exhibit | 3 00 |
| | Warrant No. 16, W. W. Wilmore, premium Boulder exhibit | 10 00 |
| | Warrant No. 17, E. T. Carr, premium Boulder exhibit | 5 00 |
| | Warrant No. 18, W. W. Wilmore, premium Boulder exhibit | 3 00 |
| | Warrant No. 19, M. G. Smith, premium Boulder exhibit | 5 00 |
| | Warrant No. 20, M. G. Anderson, premium Boulder exhibit | 1 00 |
| | Warrant No. 21, C. J. Kelly, printing | 12 50 |

Carried forward \$ 1,054 55

| | | |
|----------|---|------------|
| | <i>Brought forward</i> | \$1,054 55 |
| June 20, | Warrant No. 22, Boulder Local Miner, printing | 2 50 |
| | Warrant No. 23, W. B. Felton, attend- ance executive committee | 14 75 |
| | Warrant No. 24, David Brothers, attend- ance executive committee | 10 50 |
| | Warrant No. 25, C. S. Faurot, attend- ance executive committee | 7 50 |
| Oct. 2, | Warrant No. 26, Delta County Horticul- tural Society, premium Cañon City exhibition | 35 00 |
| | Warrant N. 27, S. Wade, premium Cañon City exhibition | 30 00 |
| | Warrant No. 28, W. S. Coburn, premium Cañon City exhibition | 5 00 |
| | Warrant No. 29, T. E. Bird, premium Cañon City exhibition | 2 00 |
| | Warrant No. 30, A. D. Cooper, premium Cañon City exhibition | 1 00 |
| | Warrant No. 31, A. A. Ireland, premium Cañon City exhibition | 1 00 |
| | Warrant No. 32, John Gravestock, pre- mium Cañon City exhibition | 5 00 |
| | Warrant No. 33, W. B. Felton, premium Cañon City exhibition | 21 00 |
| | Warrant No. 34, Fremont County Horti- cultural Society, premium Cañon City exhibition | 65 00 |
| | Warrant No. 35, John Brierley, premium Cañon City exhibition | 5 00 |
| | Warrant No. 36, Eugene Weston, pre- mium Cañon City exhibition | 1 00 |
| | Warrant No. 37, W. C. Catlin, premium Cañon City exhibition | 5 00 |
| | Warrant No. 38, Jessie Frazer, premium Cañon City exhibition | 15 00 |
| | Warrant No. 39, Mrs. Paul Ross, pre- mium Cañon City exhibition | 1 00 |
| | Warrant No. 40, Jefferson County, pre- mium Cañon City exhibition | 20 00 |
| | Warrant No. 41, R. W. Shropshire, pre- mium Cañon City exhibition | 5 00 |
| | <i>Carried forward</i> | \$1,306 80 |

HORTICULTURAL AND FORESTRY ASSOCIATION. 401

| | |
|--|-------------------|
| <i>Brought forward</i> | \$ 1,306 80 |
| Warrant No. 42, A. M. Olds, premium mium Cañon City exhibition | 8 00 |
| Warrant No. 43, Mesa County Horticultural Society, premium Cañon City exhibition | 5 00 |
| Warrant No. 44, W. H. Coffman, premium Cañon City exhibition | 5 00 |
| Warrant No. 45, John Pierce, premium Cañon City exhibition | 3 00 |
| Nov. 20, Warrant No. 46, News Publishing Co., printing. | 5 75 |
| Dec. 31, Warrant No. 47, A. Shaw, Secretary, sal- ary 1889. | 500 00 |
| Total | <u>\$1,833 55</u> |
| Balance in Treasurer's hands Jan. 1, 1890 | \$ 204 45 |

The items comprising any of above warrants will be found in proceedings of Executive Committee who ordered them of same date of warrant.

As Secretary of the Association, and in pursuance of law, I have made the necessary annual report for 1888, and filed same in the office of Secretary of State, May 24, 1888, and hold Secretary's certificate to that fact.

The report filed with Secretary of State is made up of about 250 pages closely written, in type-writing, giving the record of the Association for 1888.

According to the provisions of law the Secretary of State is required to publish our reports bi-annually, consequently the report for 1888 will not be published until the report of 1889 is made, which is not due until June 1, 1890.

We have on hand about 250 copies of the 2,000 edition of our report for 1886-7; we can supply a few copies of full sets of all our reports.

Our Association is recognized by most all the principal Horticultural organizations of the United States;

we are almost daily in receipt from kindred associations bulletins and reports which make valuable additions to our library.

By the courtesy of the Arapahoe County Commissioners, our headquarters are in the county court-house at present.

Under our organization the Executive Committee is in charge of the interest of the Association during the interim of meetings of the members. There have been four meetings of the Committee since our January meeting. I will here refer to the record kept of these meetings that members present may be fully advised as to what has been done.

The year 1889 marks an era of prosperity unequalled in the history of Colorado Horticulture. In all sections of the State where trees, vines and plants are of sufficient age all have been well laden with fruit, notable among which are Cherries, Pears and Peaches; many trees of the kinds noted have not borne before for about nine years. As pear trees become aged they show as prolific qualities as the apple.

The acreage of fruit tree planting is rapidly increasing. A conservative estimate may place the number of trees at 200,000 for the State in 1888. The number of varieties that will acclimate in Colorado are equal to any other State. Ornamental shrubbery is a success, and especially are fine roses coming to the front. All sorts of ornamental climbers are giving good satisfaction where cared for, especially of the better kinds of climatus bulbous, and herbaceous plants do well, and all sorts of annuals are a success.

The flower trade in most localities in the State is remunerative where managed by pains-taking people. An approximate estimate of the flower and ornamental

shrubbery trade of Denver may be placed at \$100,000 per annum.

The subject of insect pests is creating some anxiety among fruit-growers; notable the Codlin Moth and Leaf Roller and Leaf Hopper. I have seen a number of apple trees almost defoliated. The application of insecticides is a study of more than ordinary interest to our association; also the diseases incident to tree, vine and plant growing. Among the most instructive and readable reports of recent publications I have read, are the results as given in the last report of the Experimental Station at our Agricultural College.

During the past year the Executive Committee ordered a spring and fall exhibit of horticultural products. The spring meeting was held at Boulder in June, and the fall exhibit at Cañon City in October. Both exhibits were a success, and proper record has been kept of results. The detailed financial statement of these meetings will appear in the Secretary and Treasurer's reports.

By the provisions of law Mr. F. J. V. Skiff, Commissioner of Immigration, employed PRESIDENT FAUROT and myself as special agents to make a comprehensive exhibit of the horticultural products of Colorado at the Chicago Exhibition. By an agreement between PRESIDENT FAUROT and myself, FAUROT was to canvass the portion of the State north of Denver and I south. The collection was timely and successfully made; and FAUROT was in charge of exhibit at Chicago, and is fully competent to speak of results when this topic comes up for discussion in our regular programme.

By a special request of the Executive Board of the Pueblo State Fair Association, our Association was invited to make an exhibit at their October meeting, they

meeting all incidental expenses attendant thereon. Accordingly a duplicate collection was made at the same time as the Chicago collection and resulted to the entire satisfaction of all concerned. The exhibit showed over one thousand plates of all kinds of fruits, numbering about eight thousand specimens of apples, pears, peaches, apricots, quinces, nectarines, etc.

I will avail myself of the opportunity in this report to acknowledge my obligations to the several railroads of the State for free transportation to and from the several points I have had to visit in making the collections; also to the express companies and press of the State for courtesies extended.

The following is a statement of my incidental expense account as Secretary for the year 1889:

SECRETARY'S REPORT OF EXPENSES FOR 1889.

RECEIPTS.

| | | |
|---|----|-------|
| Jan. 1, Balance from 1888 | \$ | 07 |
| James Ackerman, Hygene, annual membership | | 1 00 |
| Levi Booth, Denver, annual membership | | 1 00 |
| Mrs. M. A. Booth, Denver, annual membership | | 50 |
| E. Easley, Golden, annual membership | | 1 00 |
| D. M. Easley, Golden, annual membership | | 50 |
| J. S. Ibbeson, Denver, annual membership | | 1 00 |
| Mrs. J. S. Ibbeson, Denver, annual membership | | 50 |
| J. S. McClelland, Fort Collins, annual membership | | 1 00 |
| Dall DeWeese, Cañon City, life membership | | 10 00 |
| Mrs. H. P. Merrill, Denver, annual membership | | 50 |
| <i>Carried forward</i> | \$ | 17 07 |

HORTICULTURAL AND FORESTRY ASSOCIATION. 405

| | |
|---|----------|
| <i>Brought forward</i> | \$ 17 07 |
| S. R. Pratt, Denver, annual membership | 1 00 |
| E. Milleson, Denver, annual membership | 1 00 |
| M. Milleson, Denver, annual membership | 1 00 |
| L. J. Milleson, Denver, annual membership | 50 |
| A. E. Gipson, Greeley, annual membership | 1 00 |
| E. J. Hubbard, El Moro, annual membership | 1 00 |
| S. A. Osborn, Denver, annual membership | 1 00 |
| David Brothers, Denver, annual membership | 1 00 |
| Mrs. David Brothers, Denver, annual membership (Paid in 1888) | |
| T. H. Kellogg, Denver, annual membership | 1 00 |
| C. S. Faurot, Boulder, annual membership | 1 00 |
| Geo. B. Bowman, Pueblo, annual membership | 1 00 |
| Jacob Haver, Pueblo, annual membership | 1 00 |
| John Tobias, Denver, annual membership | 1 00 |
| Allen Lewis, Denver, annual membership | 1 00 |
| W. W. Wilmore, Denver, annual membership | 4 00 |
| C. L. Hughes, Denver, annual membership | 1 00 |
| W. E. Pabor, Denver, annual membership | 1 00 |
| E. P. Horn, Argo, annual membership | 1 00 |
| J. W. Rose, annual membership | 1 00 |
| W. B. Felton, Cañon City, annual membership | 1 00 |
| S. Allen Long, Denver, annual membership | 1 00 |
| Mrs. S. Allen Long, Denver, annual membership | 50 |
| D. S. Harris, Burlington, annual membership | 1 00 |
| <i>Carried forward</i> | \$ 39 07 |

| | |
|--|----------|
| <i>Brought forward</i> | \$ 39 07 |
| J. H. Brammeur, Burlington, annual membership | 1 00 |
| G. H. Parsons, Colorado Springs, annual membership | 1 00 |
| L. J. Peabody, Denver, annual membership | 1 00 |
| Rev. Paul Anderson, La Jara, annual membership | 1 00 |
| Mr. Wadsworth, Denver, annual membership | 1 00 |
| From Treasurer for Secretary's incidental expenses | 25 00 |
| A. J. Van Deren, annual membership | 1 00 |
| Ed. S. Honsel, Boulder, annual membership | 1 00 |
| Robt. Stevens, Longmont, annual membership | 1 00 |
| Eugene Wilder, Boulder, annual membership | 1 00 |
| Edw. S. Walker, Boulder, annual membership | 1 00 |
| C. A. Clark, Louisville, annual membership | 1 00 |
| John Brierley, Boulder, annual membership | 1 00 |
| Mrs. B. M. Williams, Boulder, annual membership | 50 |
| Peter Leyner, Canfield, annual membership | 1 00 |
| Mrs. J. W. Andrews, Boulder, annual membership | 50 |
| Mrs. K. C. Barker, Boulder, annual membership | 50 |
| E. T. Carr, Boulder, annual membership | 1 00 |
| C. S. Land, Montrose, annual membership | 1 00 |
| Thos. Wells, Cañon City, annual membership | 1 00 |
| W. S. Coburn, Paonia, annual membership | 1 00 |
| Wm. B. Upton, Montrose, annual membership | 1 00 |
| <i>Carried forward</i> | \$ 83 57 |

HORTICULTURAL AND FORESTRY ASSOCIATION. 407

| | |
|---|----------|
| <i>Brought forward</i> | \$ 83 57 |
| J. H. Harrison, Cañon City, annual membership | 1 00 |
| A. D. Cooper, Cañon City, annual membership | 1 00 |
| Thos. Prescott, Cañon City, annual membership | 1 00 |
| Mrs. A. R. Toof, Beaver Station, annual membership | 50 |
| W. A. Stump, Cañon City, annual membership | 1 00 |
| W. B. White, Cañon City, annual membership | 1 00 |
| John Pierce, Beaver Station, annual membership | 1 00 |
| John Gravestock, Cañon City, annual membership | 1 00 |
| S. W. DeBusk, Trinidad, annual membership | 1 00 |
| Geo. Westlake, Denver, annual membership | 1 00 |
| Orange White, Florence, annual membership | 1 00 |
| Wm. Barker, Wetmore, Custer County, annual membership | 1 00 |
| Thos. Ripley, Cañon City, annual membership | 1 00 |
| C. W. Fenlason, Oxford, Otero County, annual membership | 1 00 |
| W. C. Catlin, Cañon City, annual membership | 1 00 |
| Total receipts for 1889 | \$ 98 07 |

DISBURSEMENTS.

| | |
|---|----------|
| Jan. 12, Paid Miss Patton, reporting proceedings of annual meeting, 1880 | \$ 24 00 |
| Paid lunches Miss Patton | 1 25 |
| Jan. 16, Postage | 25 |
| Jan. 18, Mrs. Tongue, typewriting copies Supreme Court decision | 5 00 |
| Jan. 24, Postage | 25 |
| Jan. 28, Broom | 40 |
| Feb. 4, Postage | 50 |
| Apr. 2, Postage | 50 |
| Apr. 4, Paid expressman | 2 00 |
| Apr. 24, Stationery | 1 75 |
| May 2, Pens and paper for report | 1 25 |
| May 3, Postage | 50 |
| May 4, Wrappers and postage Boulder premium list | 1 00 |
| May 6, Postage Boulder exhibition | 25 |
| June 3, Postal cards and stamps | 50 |
| June 18, Stationery | 1 35 |
| Postage | 50 |
| June 19, Three class books, Boulder meeting | 45 |
| Mucilage | 25 |
| Secretary, hotel bill Boulder meeting | 3 00 |
| Paid Miss Patton, reporting Boulder meeting two days | 10 00 |
| Paid Miss Patton, hotel bill Boulder meeting | 3 00 |
| Paid Miss Patton, railroad fare Boulder meeting | 3 60 |
| Paid Miss Patton, hack fare Boulder meet- ing | 50 |
| Paid Miss Patton, stationery Boulder meeting | 25 |
| Ribbon for premiums | 2 15 |
| July 15, Express on Kansas reports | 1 15 |
| July 20, Express on premium register | 35 |
| Express on warrant book from Boulder | 25 |
| July 28, Postage | 50 |
| Stationery | 1 50 |
| July 29, Postal wrappers Cañon City premium lists | 50 |
| Aug. 3, Postal wrappers Cañon City premium lists | 25 |
| Carried forward | \$ 68 95 |

HORTICULTURAL AND FORESTRY ASSOCIATION. 409

| | | |
|---|---|----------|
| <i>Brought forward</i> | | \$ 68 95 |
| Aug. 27, Wrappers, envelopes and stamps, Cañon City exhibition | 1 | 75 |
| Aug. 28, Express programmes from Cañon City | | 35 |
| Sept. 4, Postage Cañon City exhibition programmes | | 50 |
| Sept. 21, Express on reports to Webster Davis | | 30 |
| Postage | | 25 |
| Sept. 23, Stamps and envelopes to send railroad rate to Cañon City exhibition | 1 | 50 |
| Sept. 30, Class books for Cañon City exhibition. | | 10 |
| Mucilage for Cañon City exhibition | | 10 |
| Pens for Cañon City exhibition | | 10 |
| Paid expressman taking records, etc., to depot for Cañon City exhibition. | | 50 |
| Oct. 1, Ink and twine, Cañon City exhibition. | | 30 |
| Paid expressman at Cañon City for delivery record, etc. | | 25 |
| Oct. 2, Ribbon for awards Cañon City exhibition | 1 | 00 |
| Oct. 4, Printing signs, fruit display for counties at Pueblo | | 85 |
| Photograph fruit display at Cañon City | | 70 |
| Expressman taking books, records, etc., to depot from Cañon City exhibition | | 50 |
| Dec. 20, Postage circulars annual meeting, 1890 | 2 | 50 |
| Dec. 22, Type written notices railroad fare to annual meeting, 1890. | 2 | 00 |
| Total disbursements, 1889 | | \$ 82 50 |
| Jan. 1, 1890, Amount in Secretary's hand | | \$ 15 57 |

That part of Secretary's report relating to finances was referred to Finance Committee.

Treasurer Davis gave a statement of all funds passing through his hands for year 1889, which was referred to Finance Committee.

TREASURER'S REPORT FOR 1889.

RECEIPTS.

| | |
|---|-------------|
| April 9. From Secretary Shaw, special appropriation for relief of Association | \$ 1,000 00 |
| Annual appropriation, 1889 | 1,000 00 |
| From Secretary Shaw on account Cañon City exhibition | 38 00 |
| Total. | \$ 2,038 00 |

DISBURSEMENTS.

| | |
|--|-----------|
| Warrant No. 1. A. Shaw | \$ 400 00 |
| 2. N. Millett. | 300 00 |
| 3. C. S. Faurot | 5 00 |
| 4. J. M. Clark | 185 70 |
| 5. A. Shaw | 25 00 |
| 6. C. S. Faurot. | 10 85 |
| 7. D. Brothers. | 6 00 |
| 8. J. Tobias | 6 00 |
| 9. W. Davis. | 2 50 |
| 10. W. B. Felton | 11 00 |
| 11. John Brierly | 32 00 |
| 12. Ed. Hubbard | 20 00 |
| 13. Mrs. A. Gallup | 10 00 |
| 14. J. S. Ibbison | 1 00 |
| 15. Chas. Welmore | 3 00 |
| 16. W. W. Welmore | 10 00 |
| 17. E. T. Carr. | 5 00 |
| 18. W. W. Welmore. | 3 00 |
| 19. M. G. Smith | 5 00 |
| 20. M. G. Anderson. | 1 00 |
| 21. C. J. Kelley. | 12 50 |
| 22. Boulder Local Miner | 2 50 |
| 23. W. B. Felton | 14 75 |
| 24. David Brothers | 10 50 |
| 25. C. S. Faurot | 7 50 |
| 26. Delta County Horticultural Society | 35 00 |
| 27. S. Wade | 30 00 |
| 28. W. G. Coburn. | 5 00 |
| 29. F. E. Bird | 2 00 |
| 30. A. D. Cooper | 1 00 |

Carried forward \$ 1,162 80

HORTICULTURAL AND FORESTRY ASSOCIATION. 411

| | | |
|--------------------------------------|---|-------------|
| | <i>Brought forward.</i> | \$ 1,162 80 |
| Warrant No. 31. | A. A. Ireland | 1 00 |
| 32. | John Gravestock | 5 00 |
| 33. | W. B. Felton | 21 00 |
| 34. | Fremont County Horticultural Society | 65 00 |
| 35. | John Brierly | 5 00 |
| 36. | Eugene Weston. | 1 00 |
| 37. | W. C. Catlin | 5 00 |
| 38. | Jesse Frazer. | 15 00 |
| 39. | Mrs. Paul Ross | 1 00 |
| 40. | John Tobias, Jefferson County | 20 00 |
| 41. | R. W. Shropshire | 5 00 |
| 42. | A. M. Olds | 8 00 |
| 43. | Mesa County Horticultural Society | 5 00 |
| 44. | W. H. Coffman | 5 00 |
| 45. | John Pierce | 3 00 |
| 46. | News Publishing Co | 5 75 |
| 47. | A. Shaw | 500 00 |
| Balance Jan. 1 in my hands | | 204 45 |
| | | \$ 2,038 00 |

Meeting adjourned to 2 o'clock, p. m.

AFTERNOON SESSION.

2 O'CLOCK, P. M.

Association met pursuant to adjournment.

PRESIDENT FAUROT delivered his annual address as follows :

Members of Colorado State Horticultural and Forestry Association, Ladies and Gentlemen:

We are again assembled together for the purpose of deliberating over subjects near and dear to our hearts, and for the purpose of interchanging ideas and to formulate them the better to enable us to carry forward this work. Ten years ago a few energetic men met together and organized the Colorado State Horticultural Society,

amid such difficulties and discouragements as but few can comprehend, and at a time when every one was ready to denounce Colorado a failure so far as fruit-growing was concerned; and the man who stood up in defense of Colorado as a fruit-growing State did it at the expense of being laughed at and called a fool or a crank. Yet these men went forward in their determination to grow fruit, meeting and overcoming obstacles that seemed to defy every effort. And did they succeed?

For an answer to this question, I will invite you to look back over the past a few years and take Colorado as she was twenty years ago. At that time there were a few fruit trees set in Boulder, Jefferson and Fremont counties, the entire State at that time being looked upon as fit only for stock purposes, and as the home of the buffalo and antelope, it being thought impossible even for Colorado to become an agricultural State. "Time brings all things even if we but watch the hour" and "all things come to him who labors and waits." These old adages are equally as applicable to horticultural success, as to the affairs of the heart or of state. There is no State in the Union in which agriculture and horticulture present a parallel to our own; and as we must acknowledge horticulture the fine art of farming, and like all other fine arts, such as music and painting, it requires the exercise of patience, application, perseverance and practical skill. Proficiency cannot be attained through genius or inspiration alone, but must come by earnest and persistent labor. Enthusiasm in one's work is also a necessary element of success; therefore the horticulturist must be an enthusiast.

It is here in Colorado where climate is genial, the soil fertile, and the people industrious and intelligent, that agriculture as a science, and horticulture as an art, are destined to reach the highest form of development and

perfection of which they are capable. Every variety of the natural products of the soil, from those of semi-tropical growth and luxuriance to the simple blossoms on the borders of the snow-lined mountains, are found in this grand State of ours. Colorado has grown in the last twenty years from less than two hundred fruit trees to over five hundred thousand at the present time, and the greatest part of these has been set in the last five years, and extending over a scope of country from north to south along the eastern slope of the mountains, from four hundred miles long by fifty in width; thence westward to Mesa and Delta Counties on the western slope of the mountains, giving us an area of about twenty-three thousand square miles. With such a diversity of soil and climate that it makes it possible to grow almost any kind of fruit, and with our one hundred and twenty-five varieties of apples that we are now growing, and with our pears, peaches, plums and cherries, and with our vast number of varieties of small fruits, we have got a foundation laid upon which we can build one of the greatest industries of our State. It has been truly said that one of the great secrets of American success is the universal disposition to get together and talk things over. All branches of business have their associations, their unions or other organizations in which they meet and confer. In fact, there is no branch of general business, no profession or calling of men in the United States but that have regular and stated meetings for consultation and comparison of views and discussions, as to the best manner and mode of conducting their respective callings. It seems only the proper thing, then, for us as horticulturists to do is to meet together as often as practicable for the purpose of discussing the best means whereby we can successfully carry forward this work. And with that object in view we held a summer meeting at Boulder in the last days of June, which I am happy to say was a

very successful one so far as the interest manifested by those that were present, although the attendance was quite small. We had a very fine display of such fruits as were then in season, and one of the finest displays of flowers and floral designs that was ever shown in the State. And could our members but see the good that will result from these meetings, and what they are losing by not attending them, they would not allow anything to deter them from attending.

The meeting that was held at Cañon City in October was a grand success in attendance. The display of fruits was a magnificent one, and I regret very much I was unable to attend this very interesting meeting, owing to my absence from the State at that time, and can not therefore speak in detail of the fruit that was on exhibition, but I presume our Vice-President, W. B. FELTON, will give us an account of the meeting before the close of this session.

Although these meetings did not increase our membership to any great extent, I trust it will have the effect of giving the people of the State an idea of the magnitude of this work, and that they will see the necessity of joining us, and by their aid and counsel help us to carry forward this work, for we must have a unity of action among those engaged in horticultural work if we expect to succeed.

Our insect enemies are fast gaining ground, and unless we use very heroic methods of trying to rid ourselves of them they will very seriously injure our business. And I would very respectfully call the attention of the Society to the growing necessity of adopting some simple text-book in our public schools on the subject of entomology and horticulture, giving an outline classification of insects, so as to enable our children to know their friends from their enemies. Entomology,

when considered in its true relation to horticulture and agriculture, becomes a subject of vital importance; a question of profit and loss, of success or failure. Very few persons realize the immense loss annually caused by insect depredations. I would therefore recommend that this Society urge upon our next Legislature the necessity of some good and sufficient laws in regard to the horticultural interest, and ask them to create the office of State Entomologist, and make the suitable appropriation for maintaining the same.

As a Society we are called upon to extend the field of observation and to recommend such fruits as will be the most likely to succeed with us; but this is indeed a hard thing for us to do with our limited means for experimental work. What we need and should have, is not less than three experiment stations—one in the western part of the State, one in the southern, and one in the northern part; and I hope you will, as a Society, do all you can to bring this matter before our law makers at their next session.

Since the Forestry Association has been consolidated with the Horticultural Society, I should like to call your attention to this very important branch of horticulture, and urge you to take such steps as may seem best for the better protection of the forests on our mountains and for the establishing of forest experiment stations on our plains, for the purpose of growing such forest trees as will succeed on our dry and arid plains, for, in my judgment, this is of vital importance to horticultural pursuits in our State and is the key to our success; for where forest trees can be successfully grown you can grow the apple, peach, pear and plum, as well as all of the small fruits. This very important subject has never received any very great amount of attention at our hands, although we have got a forest department with a very

able gentleman at its head. I am sorry to say that the work from that department has never been of character to benefit us very much. We must have something of a more practical nature than that of memorializing Congress for the better protection of our forests. It is well known to the most of us that give this matter any thought that the destruction of the forests on our mountains is being carried on from year to year, and that it is having a very serious effect on the water supply. The forests serve a two-fold object in regulating the flow of water—they not only protect the snow from the hot sun and west winds, but they are a great store-house of moisture. The refuse that naturally collects in our forests becomes saturated, and, aside from what it thus contains in connection with the living foliage, makes a perfect protection against too rapid evaporation.

The phenomenon of hard rains on the mountains without any perceptible rise in either spring or creek, and the phenomenon of a protracted drought without any perceptible diminution in the flow of water, are constantly recurring, and have this explanation: Leaf and bark must first be saturated; then the moisture falls gently down on the sponge-like mass of roots; this is filled; then the ground beneath, softened by the upper deposit, gathers the rain-fall deeper into the very heart of the hill-side, to find its way out through the openings nature has provided. As further proof of this theory, I will call your attention to the floods that are occurring every year on the rivers that drain the great water-sheds of the North-west, upon the head waters of which the forests are being very rapidly destroyed. In my judgment we need more specific laws in our State in regard to the forestry department, defining the duties of the Commissioner a little more fully, and for the establishing of forestry experiment stations. And I herewith

submit a bill which I should like very much to see become a law:

AN ACT

TO ESTABLISH AN EXPERIMENTAL FORESTRY STATION AND TO PRESCRIBE THE POWER AND DUTIES OF THE STATE FORESTRY COMMISSIONER OF THE STATE OF COLORADO.

SECTION 1. That there be, and is hereby, set apart such portions of the agricultural, farm, and State experiment stations as in the judgment of the State Board of Agriculture and Forestry Commissioner may be deemed necessary for the purpose named in this act; *Provided, however,* That such tracts or portions of land shall not be less than twenty (20) or more than fifty (50) acres on each of said farms or stations.

SEC. 2. The Commissioner of Forestry shall establish a forestry experiment station upon each of said tracts, the object of which shall be the promotion of the art of forestry, and where he shall plant seeds and cuttings of various kinds of forest trees, especially such as are likely to thrive on the plains of Colorado; the seedlings or trees grown from which he shall issue free of charge at each station to any resident of the State of Colorado who may apply for the same, in such quantities and under such restrictions as may in the judgment of said Commissioner be advisable.

SEC. 3. The Commissioner of Forestry by himself, or suitable employé, shall give such information as may be in his possession, by letter, circular, or otherwise, upon the subject of forest trees, and shall give all persons visiting these experiment stations the benefit of his experience and that of his predecessor.

SEC. 4. Said Commissioner of Forestry shall annually make a report to the Governor, giving a detailed account embodying a full statement of all expenditures in office, including purchase of all the stock, trees, seeds, plants and cuttings, as well as the expenditures for labor, printing, traveling and any other expenses properly appertaining to his office. He shall embody in such report a detailed account of his experiments in tree growing, noting the failures as well as causes of success, to

the end that reliable information may be disseminated. He may also make such recommendations as may be suggested by his experience.

SEC. 5. It shall be the duty of the Commissioner of Forestry, when required by a petition of not less than twenty-five (25) persons in any county in the State, to go into such counties and hold one or more meetings therein for the dissemination of knowledge upon the subject of forestry; *Provided, however,* That such meetings shall be no expense to the State.

SEC. 7. Before entering upon the duties of his office, the Commissioner shall take and subscribe the usual oath of office and enter into a bond to the State of Colorado, said bond to be approved by the Governor, in the sum of five thousand dollars (\$5,000) for the faithful performance of the duties of his office.

SEC. 7. For the purpose of carrying into effect the provisions of this act, there is hereby appropriated out of any money in the State treasury not otherwise appropriated, for the year 1891, for the purchase of trees, plants, seeds and cuttings or so much thereof as may be necessary, the sum of three hundred dollars (\$300); for labor, freight, postage and all other expenses the sum of fifteen hundred dollars (\$1,500). For the year 1892, for the purchase of trees, seeds, plants and cuttings, or so much thereof as may be necessary, the sum of five hundred dollars (\$500); for labor, freight, postage and all other expenses, the sum of two thousand dollars (\$2,000).

SEC. 8. All bills and accounts of said Commissioner of Forestry shall be duly verified and approved by the Governor, and payable by the State Treasurer upon the warrant of the State Auditor.

I should like to call your attention at this time to the subject of picking and packing fruits for the market. I hear a great deal of complaint from some of our farmers who are growing apples for the market, that they find it very hard to sell their fruit. Now, in my judgment, the trouble lies largely with the farmer himself. He does not take enough pains in gathering or packing his fruit.

A farmer should first know what constitutes a first-grade apple. They should not be overripe nor undeveloped, as those often are that grow in the center of the tree. The tendency of our farmers are to set their apple trees too close together, thereby greatly increasing the number of undeveloped and poorly-colored apples, and thereby diminishing the amount of first-grade fruit. Apples should be gathered as soon as the seeds are well colored; and in gathering them great care should be taken in order that they will not get bruised. The picker should gather the fruits one by one, laying them in a basket or sack suspended from the shoulders. The basket or sack should hold about one-half bushel. As the apples are picked they should be taken to some convenient place where they are sorted and packed. All shippers should use a uniform size of box or barrel for shipping. Never ship your apples in sacks, for if you do you can never expect to get a first-class price. You cannot be too careful in gathering your fruit for the market, and the rule will hold good in gathering all of our small fruits. Great care should be used in gathering the strawberry, raspberry and the blackberry that there may be no soft berries in the boxes, and that the boxes are clean and well filled; and I think if the growers in one locality would use the same style and size of box and crate for shipping it would be much better. I would recommend that this Society take some step at this meeting to regulate the size and shape of all packages for shipping; and to do this it would be necessary to organize a fruit-growers' association.

I should like to call your attention at this time to the importance of organizing auxiliary societies. We should have a society in every county in our State where there is any horticultural work being done. It is very necessary to have this done in order that the society may be maintained. And I hope the members of this

Association will do all they can to build up the new organization in their localities, and I would recommend sending some good man into the counties where they have no societies for the purpose of organizing them, and that the necessary expense be paid by this Society.

It has been the custom of this Society since its organization to appoint at each of our annual meetings the various standing committees, and I am sorry to say that with a very few exceptions the committees so appointed have never made any report to the Society, whether it be for a lack of time, or from a want of knowledge as to the nature of such reports, I am unable to say. But I think if those that are placed on these committees from time to time could realize the value of their reports, I am sure they would find time and means to get them ready for our meetings; for it is to these committees we look for a careful presentation by each in its own special field of all new ideas and discoveries emanating from reliable sources, and accompanied with the evidence pro and con as to their practical reliability and value. A full discharge of such duties by our various standing committees would present to us at each meeting a most interesting mass of material for profitable discussion. And I would suggest to the members of our standing committees that they keep themselves diligently on the lookout for new ideas, new discoveries and new improvements in the various branches of horticulture, pertaining to their respective allotted fields; that they keep convenient memorandum books and jot down in season and out of season items which seem to be worthy of special mention in their reports. If you will do this, you will have a report ready for our meetings with but little trouble or time. And I would advise you to create two new committees—one on Experiment Stations and one on Nomenclature and Seedling Fruits.

I should like to call the attention of the Society to the nomenclature and seedling fruits. I should like to impress upon you the importance of this subject, not for yourselves alone, but for the good of our Society. Colorado is a great State, but with all of her greatness she can not produce so great a number of seedling apples as we could wish to credit her with, and I hope those of us growing apples will be very careful about giving our fruit new names or to call them seedlings. I find that Colorado has produced from seventy-five to one hundred fine seedling apples, as well as a vast number of plums and peaches. Considering the intelligence and knowledge which exists among our people engaged in pomological pursuits, and the progress and development which characterizes this industry during this age, any negligence or indifference in propagators or planters should be emphatically denounced. There is no plea or excuse for any of our growers to call every apple of which they do not chance to know the name a seedling, and this will apply to the plum and peach as well. Colorado fruit industry only dates back a very few years, not to exceed twenty at the farthest, and the most of our planting has been done in the last ten years; therefore it is impossible that we could have produced so many fine seedlings, as it is a well known fact that a seedling apple does not come into bearing until it has attained the age of from ten to fifteen years. It is, therefore, very necessary that we should be very careful in calling our apples seedlings when putting them on exhibition. I think the trouble can be traced back to our first planting. When our trees killed back badly for the first few years until they became acclimated and were able to stand our winter, and when they began to bear many of us thought they must be seedlings, when, if we had taken the trouble to investigate, we would have found that the original graft had never killed quite down to the seed-

ling stock on which it was grafted. I found it very difficult, in putting the apples on exhibition at Chicago last fall, to get the seedlings properly named, as I found so many of our so-called seedlings identically the same as our old standard apples that they are growing in the East.

In the history of this Society there has sometimes arisen some dissention, and an effort has been made by a few who claimed to be one of us, and sat at our table and ate of our fruits, to destroy the Society, and failing in that have tried to injure its ability to continue its work, and I am glad to say that they gathered no sympathy, and finding that the Society was destined to move on in the even tenor of its way, and the Society has gone forward almost without interruption in its work; new friends have gathered about it and joined hands with the old workers and though there have been times when the clouds seemed dark, yet to-day the sunshine for us is brighter than ever before, and a glorious field of success lies before us, and I am happy to say there is no dissension within our membership and the most friendly feeling prevails toward our Society through the State.

I should like to call your attention at this time to the work that has been begun by the Bureau of Immigration and Statistics in showing to the people of the world the wonderful products of our State. And should this department of State (for I consider it as much a department of State as any of the other State departments that are considered necessary and essential to maintain the dignity and advance the interest of this State) be maintained and be able to go forward with the work it has just begun, it will ultimately result in great good to the horticultural and agricultural interest of our State. Colorado has always been looked upon as only a mineral producing State, and when you speak of her as

an agricultural State to people living in the East they laugh at you; and when you tell them of her wonderful horticultural advantages over other States they think you are a fit subject for an insane asylum.

The display of Colorado's products at the Chicago Exposition last fall will do the State more good than it would derive from the expenditure of hundreds of thousands of dollars in printed matter. When we send out our pamphlets, as is being done from so many sections of the State at the present time, setting forth the wonderful advantages of Colorado over other States—when read (if read at all) are pronounced a humbug, and the universal verdict of those reading such matter is, that it is very much over-drawn. And had Colorado sent her most gifted men to Chicago and had them tell the thousands of people that visited the Exposition during the forty days that it was in progress, of our varied resources and the many advantages our State offers to those seeking investments, as well as those who may be seeking a home, could not have done our State the good that our exhibit did. When the people are shown, as they were at Chicago, the actual products of the soil and orchard, as well as those of the mines—gold, silver and coal—they can not but believe Colorado is all we claim for her.

Although the time for collecting the products of the State was very short, it all being done in about two weeks, the display was a very creditable one, and I will not, at this time, enter into a detailed description, as there has been so much written about it by the press of the State. However, I should like to say a word about the agricultural and horticultural display. I found it hard to convince people that the grain and grass grown were really products of the State. The brightness of our grain and straw was a wonder to every one, and I was asked hundreds of times if the grain and straw had not been bleached. And when they saw the growth of

straw and were told the amount produced per acre, their enthusiasm knew no bounds. And when the fruit was sent forward and placed in position, covering, as it did, over one thousand square feet of floor space, there being about one thousand plates of fruit, consisting of one hundred and twenty-five varieties of apples, fifty of pears, fifty of grapes, forty-five of plums and thirty-five of peaches. This fruit was gathered from Mesa, Fremont, Jefferson, Boulder and Larimer counties, representing, as it did, all sections of our State. This display occupied a very central position, and was pronounced by every one who saw it to be the finest collection of fruit ever exhibited by any one State, or any number of States. Gentlemen who have spent a life in horticultural pursuits and had seen exhibits of fruit in different parts of Europe, as well as in our own country, pronounced it the finest collection they had ever seen, so far as form and color went, they being perfect in that respect. If those gentlemen who so kindly gave their fruit for this exhibit could have been there and heard the many compliments paid our State, I am sure they would feel well repaid. The ladies, especially, (and I thank God for the ladies), would come back time after time to look at the fruit and beg for just one specimen, that they might take it home with them as a design to draw and paint from.

I wish to urge upon all horticulturists and farmers to do all they can to aid in carrying forward the work of the Bureau, and should the work be carried forward as mapped out by Mr. Skiff, the Commissioner, it will result in placing Colorado in a position to command the respect of the entire world, and will turn the tide of immigration and capital toward our State, and we need them both. Colorado is an empire within herself, and offers a better field for capital than any other State in the Union. And should there be an exhibit at St. Louis

next year, I hope the farmers and horticulturists will send such a display of their products as was never seen before. We can do it if we will, for we have got the men with enterprise and push, and we can grow the products. Such a display would not only help our State, but would help our society, as it would give us a standing with other societies that we can get in no other way, by bringing our work before the people and demonstrating to them what we can do—and we have a great deal to do yet before we bring horticulture in Colorado to anything like perfection. We are as yet only in our A B C in this work.

Then let us so work and so cultivate trees, fruits and flowers, and develop the vernal beauties Nature's own God has given us, that when the evening shades of our life fall about us that the halo of a life well spent and a work well done will so lighten our pathway that the transition will be only one of degrees—the closing of our eyes as an innocent, weary child to sleep, and an awakening to strength and freshness of perpetual youth in the everlasting morn, and be permitted to gather the fruits of a well-spent life and drink from the stream whose waters are for the healing of the nations.

Again the hand of the All-Wise Ruler of the Universe has been stretched forth, and has taken from our midst and from our society one of our faithful workers, PROF. JAMES CASSIDY. PROF. CASSIDY has been a faithful, earnest and intelligent worker in the promotion of horticulture in our State. But amid our prosperity, and at a time when our long and untiring efforts seem about to be crowned with success, our beloved brother and co-worker is taken from us, and we are left to mourn his untimely death. Thus, one by one, the plants of this earth are taken to be transplanted to a fairer climate and a more beautiful home, for "in my Father's house there

are many mansions." The beautiful of home and home-life only fits us for the more beautiful in the hereafter. And while we recognize the fact that of earth we are, and must perish as the laws of nature demand, yet nature mourns at their seeming loss and transition therefrom.

On motion, S. R. PRATT, DAVID BROTHERS and D. S. GRIMES were appointed a committee on recommendations in President's address.

Nos. 4, 5 and 6 of programme were deferred for the present.

A rambling discussion was then had on the subject of "Orchard Culture," to be resumed at an opportune time.

Adjourned to meet at 7:30 p. m.

EVENING SESSION.

7:30 p. m.

PROF. CARPENTER, of the State Agricultural College, gave an interesting oral lecture on the subject of "Irrigation," illustrating by a series of maps and photographs the extent of the State as now supplied by irrigating facilities. A general discussion of the subject followed. Inquiries were propounded as to a probable supply of water from an undercurrent of some of our streams, and in his opinion, in many cases, a supply could be obtained.

PROF. CHARLES C. CRANDAL, of the State Agricultural College, made some general remarks upon "Injurious Insects and the Use of Insecticides."

The Committee on President's Address read a report which was adopted, as follows:

Your Committee, to whom was referred the President's address, congratulate the Association on its

thoughtful character, and recommend that that portion of it recommending the introduction of text books into our public schools on the subject of Entomology and useful Horticultural branches be referred to the Association for action, under topic No. 11 of the programme.

That the recommendation relative to legislation on the subject of Insect Enemies be considered by the Association under topic No. 14 of the programme.

That that portion relating to Horticultural and Forestry experimental stations be considered by the Association under topic No. 16 of the programme.

That as to the portions relating to the following subjects, viz.: Gathering and Marketing Fruits, Fruit-Growers' Association, Auxiliary Societies, Standing Committees, Nomenclature, are worthy of special consideration, and we recommend that they be made special orders and be called up from time to time by the President as he may find opportunity.

[Signed]

S. R. PRATT,
DAVID BROTHERS,
D. S. GRIMES,

Committee.

On motion, a committee of three, consisting of PROF. CARPENTER, S. R. PRATT and W. B. OSBORN were appointed to report a suitable obituary notice and resolutions on the death of PROF. JAMES CASSIDY.

Adjourned to meet at 10 o'clock a. m., 10th instant.

January 10, 1890.

Meeting called to order at 10 a. m., PRESIDENT FAUROT in the chair.

Minutes of 9th instant read and approved.

Committee on obituary notice of PROF. JAMES CASSIDY reported as follows:



PROF. JAMES CASSIDY.

SACRED TO THE MEMORY
OF
PROFESSOR JAMES CASSIDY,

Born in England August 5, 1847.

Died November 21, 1889.

IN MEMORIAM.

JAMES CASSIDY, M. S., late Professor of Botany and Horticulture in the State Agricultural College of Colorado, departed this life on November 21, 1889.

Such, members of the State Horticultural Society and friends, is the brief announcement of the close of the labors and earthly career of one of intimate association and acquaintance.

Suddenly has the summons come, and he obeyed the call, leaving his work incomplete, as we, in our weakness and short sight may possibly say, yet to the eye of "Him who doeth all things well," there must have been a finished work, and hence the call. We bow in submission to the inscrutable movements of a Divine Providence.

JAMES CASSIDY was born in England, August 5, 1847. At the age of twelve he was left an orphan, and had little opportunity for preferment, except by his own unaided efforts. He received a limited education, and early acquired the habit of reading extensively of the best books. He soon began work in his chosen profession, and through a series of years was found with such men as Rollison & Sons, and afterwards in the Royal Botanical Gardens, near London. Shortly after he came to America, spending a year with Gen. Howland, near New York. Returning to England later he perfected himself in all the advances in his line, and returned, spending nearly four years with Peter Henderson, the noted horticulturist. By him he was highly recommended for a vacancy at the Michigan Agricultural College, as florist, which place he filled for nine years with honor to himself and satisfaction to the Board of Control.

In December, 1882, he was tendered the chair of Botany and Horticulture in the State Agricultural College of Colorado, and on February 1, 1883, arrived and immediately began work. For nearly seven years he has been among us, in his labor, in his daily life and association.

He early took broad and comprehensive views of Colorado horticulture, and soon became an acknowledged leader and authority among us, and also outside the State.

The reports of this Society all exhibit evidences of his faithfulness to the interests of his beloved profession. In the College his work was characterized by earnestness, faithfulness and conservatism in regard to published results of labor. No one was more sensitive than he with regard to what emanated from his department or from his pen. His firm resolution and desire was that nothing go out unless it was able to withstand successfully the closest scrutiny and the severest criticism.

His experiments with potatoes, sugar beets and tobacco are valuable; while his work with vegetables and fruits, forestry, etc., never will be fully appreciated.

The work in the Experiment Station since its organization is all embodied in the first annual report, and the first eight bulletins, notably Nos. 4, 6, 7 and 8, which were wholly or partly his own. His last contribution on the "Grasses and Forage Plants of Colorado" was nearly ready for the press.

With this presentation the work is closed, and with the dedication of a page sacred to his memory, the record here will be finished.

In closing, then, let us cherish his memory as one who made many warm friends; one who lived a manly life, a life full of integrity and uprightness.

Let us cherish him as a professor who won distinction, as a citizen, as an associate and friend, who at all times and in all places was worthy of our esteem.

RESOLUTIONS ON THE DEATH OF PROF. CASSIDY.

WHEREAS, Death has removed from the ranks of our Association PROF. JAMES CASSIDY, of the State Agricultural College;

Resolved, That as members of the State Horticultural and Forestry Association, and as individuals, we are impressed with a deep sense of the loss sustained by ourselves and the State of Colorado in the death of PROF. CASSIDY. His love for fruits and flowers, his enthusiasm in all that concerned horticulture, his experiments and interesting investigations, throwing light on the many problems perplexing the horticulturist and fruit-grower, his accessibility and readiness to impart freely of his experience and learning, have made an indelible impression upon the horticulture of Colorado.

Resolved, That a page in our forthcoming report be suitably inscribed as a memorial of his life and labors, and that a copy of these resolutions be transmitted to Mrs. Cassidy, to whom we tender our heartfelt sympathy in this bereavement.

L. G. CARPENTER,
STEPHEN R. PRATT,
W. B. OSBORN,
Committee.

The report having been adopted, on motion of DR. ALEX. SHAW, the committee was continued, and instructed to procure, at the expense of the Association, an appropriate plate for printing a portrait of PROF. CASSIDY in the next report of the transactions of our Association.

The topic of Colorado's adaptation to Fruit culture was announced. Secretary SHAW read the following essay on this subject:

COLORADO AS A FRUIT-GROWING STATE.

BY DR. ALEX. SHAW.

Colorado contains 104,500 square miles, equal to 56,880,000 acres. Its area is about 736,000 acres greater than the two great States of New York and Pennsylvania combined. The contour of its surface is more varied than that of any other equal portion of the American continent, varying in altitude from 3,000 to 14,000 feet above sea level. The meteorological records of our signal stations place Colorado on the mean line of temperature of the North American continent. The temperature of different portions of the State is varied according to their peculiar surroundings, and not by altitude. At Del Norte, in the San Luis Valley, where the altitude is 7,700, I have seen well matured Ben Davis, Whitney No. 20 and Duchess of Oldenberg apples; also at Buena Vista, at an altitude of 8,000 feet

In the mountainous portions of Colorado we have an approximation temperature of the torrid, frigid and temperate zones. Hence, there is an adaptation for the growth and culture of a wide range of kinds of fruits.

In the pursuit of a personal knowledge of Colorado's adaptation to fruit culture, I have for five consecutive years made extended trips in all parts of the State. Barring the aridity of the soil, the conditions of fruit-culture obtain very generally over the State, varied according to special locations as to kinds. The fixed fact of the general aridity of the soil makes the necessity of irrigation a *sine qua non* for successful culture. In

the absence of a water supply, fruit-culture is not a success as a rule. Happily for the State, the contour of the soil is such as to admit of the application of water by irrigation, and the supply is at command. Some idea of the area of irrigable lands in the State may be had by an approximate estimate made by MR. WALTER GRAVES, who was formerly employed as topographer with the Government Geological survey of Colorado. His tabulated statement is as follows:

IRRIGABLE LAND IN COLORADO ACCESSIBLE TO WATER.

| LANDS. | SQUARE MILES. | ACRES. |
|---|------------------|------------|
| San Luis Valley | 3,096 | 1,981,440 |
| South-Western | 1,080 | 691,200 |
| Western Colorado (Grand River Valley) | 360 | 239,400 |
| West-central Colorado (Gunnison, Uncompahgre Valleys, etc.) | 720 | 460,800 |
| North-western Colorado (Valleys of the Yampa, Bear, White, and other rivers) | 1,980 | 1,267,200 |
| North-central Colorado (Valleys of the Upper Grand, North Platte, and other rivers) | 576 | 368,640 |
| Central Colorado (Grand Parks, Upper Arkansas, etc.) | 720 | 460,800 |
| In sundry small areas | 3,600 | 2,304,000 |
| East of the mountains | 41,868 | 26,795,530 |
| Total irrigable lands | 54,000 | 43,560,000 |

According to the footing of Mr. Graves' estimate, 43,560,000 acres is the possible supply of water for irrigation. The Rocky Mountain range covers nearly one-third its area and bisects the State into an east and a west division, the eastern water shed being about 26,795,000, and the west over 18,000,000 acres. There is, as a general rule, a marked difference of adaptation for fruit culture between the east and the west divisions among the deciduous tree fruits and all small fruits. The apple and the pear are at home on both sides of the range, and as a rule flourish from the extreme north to

the south. As far as I have seen fruiting, the marked difference in the localities is between stone fruits, such as cherries, plums, nectarines, apricots, and grapes may be considered on trial on the eastern side of the range, while on the west the embargo is taken off.

The past season is an exception to the past nine years as to the fruiting of plums and cherries on the eastern division. There was a combination of conditions that made fruitful all trees of plums, cherries, and peaches of mature age on the east side during the past season, such as large yellow Egg Plums, Lombard, German Prunes, Pond's Seedling, Blue Damson, Shropshire, Dawson, Green and Imperial Gage, Claude de Bavy, etc.

It is only about eight years since the removal of the Ute Indians from the Western portion of the State, but the demonstration of the past season in the fruit line brings the West to the front ranks in the production of varieties not generally grown in the East. Notable, peaches, plums, nectarines, varieties of cherries, such as Napoleon, Gov. Wood, Bigareau, etc.; *Plums*: Pond's Seedling, Claude de Bavy, Japanese, French and German Prunes, Lombard, Green Gage, Imperial Gage, Shropshire and Blue Damson, Large Yellow Egg, etc.; *Grapes*: Flame Tokay, Raisin, White, Chasselas, Seedless, Sultana, Mission, Rose of Peru, Black Hamburg, Zinfandel, etc.

The Grand River Valley and tributaries is the most noted for the production of the tender varieties. Among the special localities may be named are Montrose, Delta, Paonia, North Fork, Gunnison, Grand Junction and Fruita.

The mesa lands, where water is available, in these several localities bid fair to be the best fruit lands of the State for all varieties. Twelve thousand peach trees

near Fruita is the largest venture in a peach orchard in the State. Trees planted in the foot-prints of the receding Indian are not yet of mature age to show a full crop, but the indications are that the coming fruit lands of the State for the tender varieties are to be found in the valleys of Grand River and tributaries.

As a notable example to show that a difference of one thousand feet altitude is no bar to the growth of the tender varieties: At Paonia, North Fork of the Gunnison, the altitude is 5,500 feet, while at Grand Junction it is 4,500; yet the conditions for fruit growing are equal.

So far as I have a personal knowledge, the apple, pear and small fruits are equally at home in all portions of the State. The exceptions for tender varieties are found as above. I know no variety of apple grown in any apple country that cannot be reproduced in Colorado, and if I were assigned a field to make a collection of apples for competition as an exhibit to win, I would of choice select Colorado as against any State of the United States. So far as is known the South-western portion of the State is the peer of the west, notably the Montezuma, San Juan and Arkansas valleys.

As an indication of the results of orchard culture at Cañon City, I here give an extract of a statement addressed to me of results at the head of the Arkansas Valley by JUDGE FELTON. What is true of the conditions of fruit culture at the head of the valley will obtain throughout the whole valley when the projected water supply is at command.

JUDGE FELTON says: "I will give you a few figures as to my crop. My crop is all sold except cider and vinegar. Adding to apples sold the cider and vinegar on hand, and my apple crop amounted to \$4,361.61. I had 3,250 bushels of apples that I sold, and I ground up

1,500 bushels of wind-falls and inferior apples for cider and vinegar, making 4,750 bushels of apples that I gathered from five and a half acres. Of other fruit I sold as follows:

| | |
|---|------------|
| Pears | \$ 553 43 |
| Grapes | 373 64 |
| Strawberries | 460 75 |
| Plums | 144 46 |
| Cherries | 56 50 |
| Gooseberries, Mulberries, Raspberries, Black- berries, Currants, Peaches and Quinces . . | 73 50 |
| Total from ten acres | \$6,023 89 |

"You will observe that from five and a half acres of apples I got \$4,361.61, and \$1,662.29 from four and a half acres of other fruit. I will say, however, that my strawberry patch was old and didn't do near as well as though it had been a young patch, and that in June, 1888, I cut all my grape canes to the ground, and consequently they were not in condition to produce much of a crop this year. But with other fruit doing its best I believe that apples, one year with another, is the most valuable crop to raise—and therefore the importance of fighting the Codlin Moth efficiently.

"I don't believe that yield of apples was ever beaten on the same space of ground. I think that nearly all my apple trees are in as good condition for as large a crop next year as they were a year ago for this year's crop, except the Walbridge, which were so exceedingly full that I don't expect much from the next year.

"Yours truly,

"W. B. FELTON."

"P. S.—I came near leaving out a very important part of this statement, viz., expense. My total expense to date for labor, teams, barrels, boxes, baskets, manure, and everything is \$2,317.00, and I shall probably pay

out \$100 or \$150 more between now and April 1, 1890, which will complete the fiscal year.

"W. B. F."

| | |
|---|------------|
| Total cash receipts for ten acres | \$6,023 89 |
| Expenses | 2,467 00 |
| Net receipts | \$4,556 89 |

This topic was very generally discussed by members present, all agreeing that Colorado as a fruit-growing State is a success.

Adjourned to 2 o'clock p. m.

2 O'CLOCK P. M.

Association called to order, PRESIDENT FAUROT in the chair.

As per programme, an election of officers for the year 1890 was held, resulting as follows:

For President—C. S. FAUROT, of Boulder, Boulder County.

Vice-President at Large—W. B. FELTON, of Cañon City, Fremont County.

Treasurer—WILLIAM DAVIS, of Denver, Arapahoe County.

Secretary—ALEX. SHAW, of Denver, Arapahoe County.

Executive Committee—DAVID BROTHERS, Jefferson County; S. R. PRATT, Denver, Arapahoe County; W. B. OSBORN, Loveland, Larimer County.

The topics Nos. 10, 11 and 13 of programme were then discussed.

A paper was read as follows on

ORNAMENTATION OF SCHOOL HOUSES AND GROUNDS.

BY R. HOUSEL, OF BOULDER.

When we realize how much our lives are influenced by our surroundings, how a beautiful tree, a nicely arranged yard, a tastefully furnished room, pleases our eye and elevates our thoughts, and makes us wish we were better, raises our ideal of life and unconsciously elevates our motives, and in reality makes us the better for having come in contact with it, then we can see the great necessity for ornamenting the school-house and yard. I would that I could impress on the mind of every man that has the selecting of a location for a school-house in this free land the necessity for choosing the best site to be found in the district. How much depends on the choice of a site the future will reveal, and the future will never bring regret to the man who takes the very best place to be found—let it cost what it may. That most important step (the choosing a location) having been taken, the house should be as good as can be afforded by the people. It does not follow because the house is small and did not cost a large sum of money that it cannot be made attractive, for a skillful hand and a willing heart will soon change a bare room from a cold, cheerless place to a very pleasant, cheerful one. And must the teacher furnish the means for adorning the house and grounds, do you say? Not at all. Let the teacher lead, teach, direct. Teach the children to love the school-house, their second home as it were—the place where first they see the wonders that surround them. Catch a bird's eye view of the glories of the world. Lead them in the more active duties of fixing up house and grounds; arouse their interest by giving each one something to do to help, and trust them to find the means to accomplish it, for with all awakened

interest and wisely directed energies and a fair chance the children will be very likely to respond to the wishes of their teacher with a hearty good will and a zeal that will be apt to surprise even themselves; for if they are taught what they can expect and depend on from the growth of a few trees and bushes that will take but a little work and trouble to get started, they will be eager to make the experiment. And thus every school district in the country can be made an experiment station; and should the children in the schools of this land undertake to carry on such experiment stations, who can predict the grand results that would follow?

I take the children as the ones to do the principal part of this work, for they are the most interested parties concerned in it, and if they are made to understand the possibilities of a little well directed work, many an hour that they would spend in play will be spent in planning how they can fix up the house the nicest. Where they will plant an apple tree, where a walnut and where a rose-bush. Where they will have a ball-ground and where a plot of grass; where a swing and where a shady seat; where a vine and where an evergreen, and thus a vast array of willing workers would be enlisted in the pleasant business of ornamenting the school-houses and grounds throughout our land; and thus, while they would be doing something that will be a pleasure as well as a benefit to themselves, they would be leaving a heritage to the country that would always be appreciated, and one that they themselves could look back to with pride and pleasure, and thus the school days of the children would be one long continued practical lesson; having an immediate visible result, the beautifying of the places where they themselves must pass so many hours in work and study; and who is there that will say that the influence thus surrounding them

and gained by their own efforts will not develop in them a higher manhood and womanhood, and the better prepare them for the active duties of life, for which they are now preparing, and when they shall have advanced to wider fields of action they will carry with them the lessons learned in their childhood, and make a practical application of them in whatever position they may occupy in life's surging battle, and the place they have vacated will be filled by others, who will carry on the work for a time, and so the little work started by the children will grow and spread and bear fruit for the harvest of coming years. And, in conclusion, let me ask the earnest co-operation of parents and teachers in directing the work of the children in ornamenting the school-houses and grounds.

A motion was adopted instructing the Executive Committee to provide for two additional members to said committee by having the by-laws of Association amended to that effect.

Adjourned to 7:30 p. m.

7:30 P. M.

Meeting called to order. VICE-PRESIDENT FELTON in the chair.

The topic of Colorado's fruit show at Chicago exposition, 1889, was discussed, lead by PRESIDENT FAUROT, followed by other members, to the effect that it was a great benefit to the State.

Adjourned to meet eleventh inst. at 10 o'clock a. m.

January 11, 1890, 10 o'clock a. m.

Meeting called to order. PRESIDENT FAUROT in the chair.

Minutes of meeting tenth inst. read and approved.

J. T. CORNFORTH, of Denver, read a paper on "The Outlook of Fruit Culture in Colorado and the Best Mode of Marketing to Profit," as follows:

**COMMERCIAL ASPECT OF THE FRUIT MARKET OF
DENVER AND COLORADO.**

BY MR. J. T. CORNFORTH.

Mr. President, Ladies and Gentlemen:

But a few years ago Colorado depended upon other States for all its fruits, excepting the wild plums and wild raspberries that grow in abundance in our valleys and mountains. But how fast changes are taking place for the better! Every year shows that Colorado's orchards will soon supply the apples that we require for our own use and give us large quantities for shipment to the North and South.

The apples of Colorado are superior to any I know of, being perfect in color and flavor; and the keeping qualities are without a doubt the very best—for the exhibit made at the New Orleans exposition fully demonstrated the fact that apples grown in lower altitudes rotted very quickly, while Colorado-grown dried and shriveled, but did not rot, and the Colorado fruit remained on the tables at New Orleans for weeks, while other States had to change their exhibit every few days. Then take our strawberries, raspberries, blackberries, gooseberries, pears, plums and grapes. Not a State can make a better showing than we do.

I think this exhibit surpasses all previous efforts attempted by DR. SHAW and gives us a glimpse of what we may expect in a few years more, and should demonstrate to any thinking mind that this is the land of the deciduous fruits. It is true that we cannot grow the

orange and the banana, but I believe the time is not far distant when Colorado's deciduous fruits will be as famous as those of California, and that our orchards will prove more profitable than the citrus groves of California or Florida, for this Fair, if I may call it such, proves a great teacher, a grand, magnificent object lesson demonstrating that many portions of Colorado have climatic advantages and showing, as it does, that our fruit belt extends not only in the valleys, but in our mountains to altitudes of 7,000 feet above the sea. "Truly, this is the land of Pomona." But I must take up my subject.

If you wish to preserve apples for some length of time they should be picked by hand from the tree and carefully placed in boxes (not baskets) of about one bushel in size, this will save your fruit from bruises and much handling, which destroys fruit more than anything else.

I think deciduous fruits keep best at a temperature of about thirty-four degrees, but it does not seriously affect some varieties of apples, such as the Ben Davis, Jeniton and Missouri Pippin if they are frozen solid, providing they are thawed out gradually. But Wine Saps, Jonathans, Greenings, Bellflowers and many others will not permit of such low temperature.

I think the proper time to gather any kind of fruit for market, is when it is fully matured. Do not wait until it is ripe, for its next condition after ripeness is decay; and this brings serious loss, and causes much trouble between the grower and his commission house.

With regard to the supply of fruits there is no danger of overproduction. The prices will always be remunerative, for our population is growing so fast that it will be difficult to keep pace with its growth. Every farmer should plant trees, shrubs and vines, for one acre will

pay him more money than five acres of grain, besides giving him an increased value to his whole farm, and surrounding him with comforts and a pleasing sight, while without its orchard the farm seems cheerless and little better than a bare cattle ranch on the plains.

It would seem that with the knowledge we have of the care of orchards, that but little could be added that is new; but I clipped from a newspaper the other day the following discovery made by M. SIROY, of the Society of Horticulture, which I thought of such value that I take the liberty of quoting it. He says:

"I planted a peach orchard and the trees grew well and strong. They had just commenced to bud when they were invaded by the *Curculio* (*Pulyon*), which insects were followed, as frequently happens, by ants. Having cut some tomatoes, the idea occurred to me that, by placing some of the leaves around the trunks and branches of the peach trees, I might preserve them from the rays of the sun, which are very powerful. My surprise was great on the following day to find the trees entirely free from their enemies, not one remaining, except here and there where a curled leaf prevented the tomato from exercising its influence. These leaves I carefully unrolled, placing upon them fresh ones from the tomato vine, with the result of banishing the last insect and enabling the tree to grow with luxuriance. Wishing to carry still further my experiment, I steeped in water some leaves of the tomato, and sprinkled with this infusion other plants, roses and oranges. In two days these were also free from the innumerable insects which covered them, and I felt sure that had I made the same means with my melon patch I should have met with the same result. I therefore deem it a duty I owe to the Society of Horticulture to make known this singular and useful property of the tomato leaves, which I discovered by the merest accident."

In conclusion, it was expected that I would give a tabulated statement of fruits sold in the Denver market

in 1888. I am sorry I have not had the time to collect the data so shall give it in general.

In 1888 we used more California fruits than any other city in the country, excepting Chicago.

The apples, besides Colorado grown, came from Kansas, Michigan, New York, Pennsylvania, Missouri, Arkansas, Illinois and Canada. The stocks on hand about New Years was 17,000 barrels.

Our imported fruits, such as oranges, lemons, grapes and bananas, came mostly through New Orleans and New York, a few through Boston and Philadelphia.

Grapes, besides home grown, came mostly from California, New York and Ohio, a few from Illinois, Iowa, Kansas and Missouri.

Oranges came from Old Mexico, Florida and California.

The bulk of our peaches came from California, but some very nice fruit came from Durango, Colo., and Santa Fé, N. M. The stock received from Texas arrived in uniformly bad order.

Colorado strawberries, besides local, came mostly from Boulder, Greeley, Golden, Longmont and Cañon City, and, strange to say, the last and amongst the best came from Ouray, a town situated away up near timber line. Of Colorado blackberries and raspberries about the same remarks apply as to strawberries.

In round numbers the fruit business of Denver, in 1888, amounted to nearly \$2,000,000, and our city is the most desirably situated for the distribution of fruits; the altitude being in our favor, also the numerous railroads radiating to all points, giving us quick transportation to any part of the country tributary to the great West.

GEO. H. PARSONS, of Colorado Springs, read a paper as follows, on

FOREST PLANTING IN COLORADO.

The primary object of forestry, all over the world, is the care and preservation of the native forests. And rightly is this so. For we must have the forests. Man cannot exist without it; and as we value our lives and those of our children, so must we value the life of the forest. For this reason the first work of those interested in the welfare of the forest in Colorado has been to check the destruction that has well-nigh swept bare the surface of our hills, and has ruthlessly exposed them to the fierce agencies of wind and rain, heat and frost. Difficult and discouraging has been the work, and often has it seemed useless to go on. But gradually have the people learned the vital importance of forest on these mountain slopes, on the boundary of a great treeless plain, and at the headwaters of some of the principal rivers of our continent. Stronger and stronger has become the feeling that they must be preserved at any cost. And now we may positively look forward to the approach of a time when the forest throughout the whole Rocky Mountain region will be under a complete, systematic and scientific care and management.

This being so, we may pause in our efforts for the preservation of the trees, and come to the second part of the science of forestry, secondary not in importance, but only in its place and treatment. I mean the renewal of the forest; its replanting for timber culture; the reforestation to some extent of the vast area, which, once covered by health-giving trees, now lies bare and barren, exposed to an excessive climate, parched atmosphere, bleak winds, sudden and heavy rains, swollen or empty

streams, devastating floods, and all the evil influences that mark the absence of trees.

To this portion of forestry I wish to call your attention for a short time, and especially to that tree which nature appears to have provided as best adapted for the work we have in view.

Forest planting has one advantage over forest preservation—it is not so dependent upon the combined effort of masses or communities; it does not require the action of the government, be it county, State or National. Tree-planting is an individual effort, and each one can do his or her part, however small. Then, too, long and abundant experience has fully demonstrated that few crops from the soil are more profitable than a well managed forest; and we may set to work and plant our little acreage of trees with the self-satisfying assurance that while we are adding to our material wealth and putting money in our purse, we are seriously contributing to the future welfare of our country.

In tree-planting the first problem we have to encounter is, "What shall we plant?" As the beneficial influences of all sorts and varieties of trees are about the same, we may throw aside all sentiment in our selections and choose only from the selfish reason of profit. And what sort of tree will give most profit. It must be a rapid, healthy grower, reaching large size and producing a great quantity of valuable wood. It must be well adapted to the peculiarities of the soil and climate where it is to be planted; and, above all, it must be easily and cheaply obtained. For the dry, severe climate and high altitude of Colorado, we must be very careful in our selection, and if possible find a tree that will grow without irrigation. It may be safe to decide that an indigenous tree must be chosen—one that centuries of growth have shown to be well adapted in its

organism to all the exigencies of vegetable life in this region. One sort of tree may grow better on the plains, and another in the mountains, and much of the planting done at first must be experimental. It is impossible in the limits of this paper, to consider the various merits of every tree. All we can do is to select some one which seems to comprise in the largest degree most of the qualities we have found necessary, and examine it carefully. Let us go to Nature and see what she has prepared for us.

As we enter a Colorado forest on the rocky slopes of the foot-hills, against which rise and break the earthly billows of the ocean-like plain—as we penetrate the cañons and climb far up the mountain slopes, close to the uttermost limit of the forest—we find the one tree of the largest habitat and greatest size, straight tapering trunk and rich foliage in all exposures, shows it to be most rapid, hardy and vigorous in growth, and which seems to multiply itself most readily, as indicated by the large number of small seedlings which have sprouted readily in the dry gravelly soil in exposed situations without irrigation. The one tree sought for alike by tree-choppers, wood-cutters and saw-mill owners, and which seems to adapt itself most easily to all the vicissitudes of the climate, and to be useful for more varied purposes than any other species, is the *Pseudotsuga Douglasii*, commonly known by the various names of Douglas Spruce, Red Spruce, Mountain Hemlock, Douglas Fir, Red Fir, Yellow Fir, Oregon Pine and Swamp Pine.

This the monarch of the Rocky Mountain forest and one of the most wide-spread of trees, being found from Mexico to Sitka, from plain to Pacific, and from sea level to an altitude of 10,000 feet. Its best development is in Western Oregon and Washington, where it forms a gigantic tree over three hundred feet high and with a

trunk ten feet in diameter. In Colorado it is the first tree we meet on entering the mountains, when it is found of all sizes, from the small seedling just rooted in the dry soil to the great tree two hundred feet high. It is generally associated with pine, and forms pure growths only in a few localities, and then of small extent. It is an exceedingly handsome tree, beautiful in form and color, with soft dark green foliage and flexible branches sweeping gracefully downward and feathering out to the ground. It may be easily recognized by its dark foliage, which, unlike that of the other Rocky Mountain Spruces, is soft to the touch. It much resembles the Hemlock of the Eastern States, and may be said to be the Western representative of that species. It is generally found on shady southern slopes, and prefers a deep, moist, cool and well drained soil. But it is most accommodating, and grows in the driest and most exposed situations, in dry slaty soil and on sandy dunes. It endures drought better than most trees, grows with unusual rapidity, two or three feet in a season, and repairs damages very readily. Its strong wood and flexible branches enable it to safely resist a heavy weight of snow or a strong wind.

Its bark is greyish brown, smooth when young, and in old trees rough, deeply furrowed, and sometimes over one foot thick. It is very useful for tanning. The wood is reddish-yellow, pitchy, coarse but clean grained, elastic, rather heavy, hard, strong and durable, being especially valuable for large timber and coarse lumber, where durability and strength are needed. It is chiefly used for ties, as it does not decay or rot, like pine, and holds nails and spikes better. For this reason it is sought for sills and lumber to be used in contact with the ground. It is more liable to warp than the yellow or white pine; therefore is not desirable for fine work or

in building, except as joists. Its long straight trunk renders it in great demand for telegraph poles and piles. It makes good fuel, and though it snaps more than pine, it makes a hotter fire.

The Douglas Spruce has been extensively planted in the East, where it has proved very hardy when grown from Colorado seed, for plants raised from seed from California and the Pacific coast are quite tender and unable to endure the winter of the Middle States. Downing writes, in his description of the pinetum at Dropmore: "Perhaps the finest tree in this extensive collection is the Douglas Spruce. It is sixty-two feet high, and has grown to this altitude in twenty-one years from the seed. It resembles most the Norway Spruce, as one occasionally sees the finest form of that tree, having that graceful downward sweep of the branches, and feathering out quite down to the turf, but it is altogether more airy in form, and of a richer and darker green in color. At this size it is the symbol of stately elegance." The late Prof. U. S. Hough, formerly Chief of Forestry of the U. S. Department of Agriculture says "the Douglas Fir is incomparably the finest of the firs, surpassing them all in size and equaling the best in value as a timber tree. It is found to withstand the drought better than most Conifers, while it equals or surpasses most of them in growth." Prof. C. S. Sargent, writing of the Douglas Spruce planted in New England, says: "The young trees promise well, and grow much faster than white pines planted in similar soil, but not as fast as the European Larch."

At the recent annual meeting of the Pennsylvania Forestry Association, the President, Burnet Landreth, spoke as follows: "The Douglas Fir I consider the best of the two evergreens. It grows as rapidly as the White Pine, and if it escapes the ills of forest life and reaches

maturity, it will be more valuable. One of its merits is early maturity. Its long, tapering and light trunk particularly suits it for ship-spars, while the older trees reach vast proportions and form a trunk far surpassing the White Pine of Maine. This tree, for Eastern plantations should be grown from Colorado seed, as the Oregon variety is not so hardy.

Amongst the exotic timber trees which have been introduced into Europe during the present century, the Douglas Spruce has attracted most notice, owing to its remarkably quick growth during early youth. Specimens growing in free positions are stated to have laid on a mean annual increment of as much as three cubic feet, while only one cubic foot, at the outside, could be expected from a Larch tree. Even in a few fully stocked woods the increase appeared exceedingly great. Two trees, fifty-seven years old, measured ninety feet in height. The result of a careful survey of a plantation twenty-eight years old in Scotland, showed that an acre of Scotch Pine had given an annual production of one hundred and twenty-two cubic feet of wood, against a production of one hundred and thirty-three feet per year made by the Douglas Spruce. A cross section sent to an English museum was carefully examined and measured, and the results reported as follows: Its total diameter, including the bark, was seven feet nine inches, and the counting of the concentric rings indicated a total age of five hundred and fifteen years. At this age, which is higher than that usually attained by any European Conifer, it was still making good increment. Secondly, it showed that the enormously rapid increase of the diameter during the first twenty-five years was suddenly followed by a much smaller, and an approximately even increment during each of the following nineteen periods of twenty-five years each. Thirdly, it

showed that the sectional area increased on the whole, steadily. The periodic increment increased up to the age of four hundred years, when it commenced to fall. Taken by centuries, the fourth century yielded the largest increment. And finally, the rate of growth indicated in the section up to the thirtieth year, resembled that of the average tree in the Scotland plantation referred to above.

From these measurements, and from the experience in Scotland, the conclusion may be reached that under a rotation of seventy-five, and perhaps eighty years, the Larch will yield as much solid wood as the Douglas Spruce, whenever they are grown in regular full stocked woods, and in localities of equal quality, with this difference, that the material yielded by the Douglas Spruce will consist of a smaller number of trees per acre, with a greater mean diameter per tree. It may be added that the Douglas Spruce would yield a larger amount of wood in a rotation of from one hundred to one hundred and thirty years, than it would in a longer or shorter rotation. The difference, however, would not be great, and planters are not inclined to wait so long for returns. Experience shows that the Douglas Spruce requires ample space for its full development.

So much for the one tree which nature has placed in our hands to aid in the great work of reforestation. I would I could tell you more, but very little study has been given it, and we have much yet to learn. Well satisfied will I be if I have aided in increasing our knowledge of this magnificent specimen of vegetable life, and have induced some one to study it more carefully.

And now that we have considered so fully the question, what to plant in Colorado for timber culture, we might go on with the question that naturally follows:

How to plant. But I believe I have already occupied enough of your time, and there is no peculiar treatment required in planting the Douglas Spruce, or any tree for forest culture. Suffice it for me to say here that good, healthy, vigorous seedlings, one to two feet high, should be selected, and planted carefully in late spring before they begin to grow, and just after a good rain, or during the summer showers, after they have made the season's growth. If possible, some kind of mulching would be of great benefit, and if there is any choice in location they should be planted on a slope to the South. If you cannot get seedlings, plant the seed yourself in seed beds, where they can be sprinkled and tended carefully. Surely in no other manner can we so easily combine pleasure and profit, and place ourselves among the philanthropists of the world.

This paper was discussed by D. S. GRIMES, E. MILLESON and S. R. PRATT.

S. R. PRATT introduced resolutions in reference to State Bureau of Immigration and Statistics, which were adopted as follows:

RESOLUTIONS.

WHEREAS, By an act of the Seventh General Assembly, there was created a Department of State known as the Bureau of Immigration and Statistics; and,

WHEREAS, We, the members of the State Horticultural and Forestry Association, believe that the work of said bureau is productive of great work in our State and will turn the tide of immigration and capital toward our State; and,

WHEREAS, We represent an industry that is the foundation of all National wealth and prosperity; and,

WHEREAS, We, as horticulturists and farmers, pay a larger tax, in proportion to the wealth we represent, than any other class; and,

WHEREAS, We, as a class, will be benefited by the work of said Bureau in disseminating information concerning the resources of our State, by correspondence as well as by the grand display of the products of our State at the Chicago exposition; therefore, be it

Resolved, That we, the members of the Colorado State Horticulture and Forestry Association, do most heartily endorse the same, and express the desire that the people and our State Government foster and maintain the same, and in so doing we pledge the approval of all classes of people interested in the development of Colorado, and that we also pledge our best efforts to aid Commissioner Skiff in making Colorado's display at St. Louis next fall a grand success.

Resolved, further, That a copy hereof, attested by the President and Secretary of this Association, be transmitted to His Excellency, the Governor.

ALEX. SHAW,
Secretary.

C. S. FAUROT,
President.

The following resolutions were then adopted:

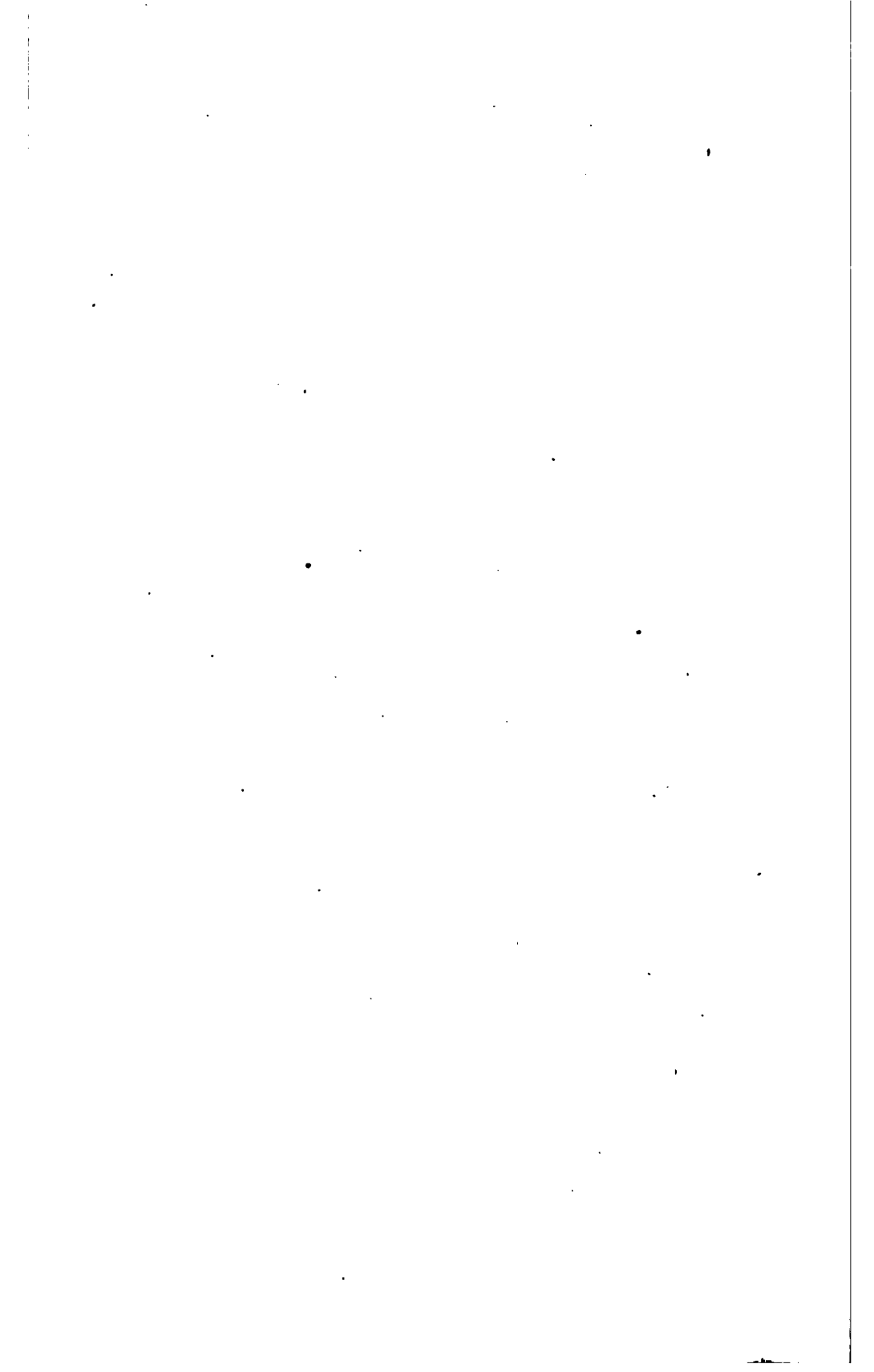
Resolved, That all unfinished business of this meeting be referred to the Executive Committee for action.

Resolved, That in the Denver Real Estate Exchange we have always found a fast friend for many favors heretofore received, and we are under renewed obligations to them for the use of their hall for purposes of this meeting.

Resolved, That we are under obligations to the Railroads centering in Denver for concessions in passenger rates to this meeting, also to the press of Denver for the liberal use of their columns.

On motion, the annual meeting of the Association for 1890, adjourned *sine die*.

REPORTS
OF
Local Horticultural Societies.



REPORT
OF THE
Northern Colorado Horticultural Society,
FOR THE
YEAR 1889.

OFFICERS FOR 1889.

PRESIDENT,
JAMES ACKERMAN, Hygene.

SECRETARY,
E. S. ALLEN, Loveland.

TREASURER,
L. H. DICKSON, Longmont.

EXECUTIVE COMMITTEE,
C. S. FAROUT, Boulder.
A. E. GIPSON, Greeley.

VICE-PRESIDENTS,
W. B. OSBORN, Loveland,
W. L. PORTER, Weld County,
G. W. WEBSTER, Boulder County,
DAVID BROTHERS, Jefferson County,
ELISHA MILLESON, Arapahoe County.

NAMES OF MEMBERS
 OF THE
 Northern Colorado Horticultural Society,
 FOR 1889.

| | |
|---------------------------------|--------------|
| Mrs. Washburn | Loveland |
| Mrs. Taylor | Loveland |
| Mr. Ackerman | Hygene |
| Mr. Louis Taft | ----- |
| Mr. Hoag | ----- |
| Mr. Milleson | Denver |
| P. D. Goss | Loveland |
| A. Wild | ----- |
| Volney Chapman | Loveland |
| David Brothers | Jefferson Co |
| Alex. Shaw | Denver |
| W. B. Osborn | Loveland |
| Mrs. J. S. McClelland | Loveland |
| E. S. Allen | Loveland |
| J. A. Little | ----- |
| S. W. Cole | Berthoud |
| Mrs. M. J. Telford | Arvada |
| Andrew Buchanan | ----- |

PROCEEDINGS.

LONGMONT, Dec. 10, 1889.

The annual meeting of the Northern Colorado Horticultural Society convened to-day in this place, PRESIDENT ACKERMAN presiding.

The meeting was opened with prayer by REV. WILCOX, after which the Society was welcomed to Longmont by O. A. MCFARLAND in a very happy manner, and was responded to by C. S. FAUROT; after which the meeting occupied its time in a free-for-all discussion on picking and keeping apples for Winter use, led by DAVID BROTHERS, who thought apples should be gathered before entirely ripe, and considered nine barrels a day's work for one man, and a damp place the best for keeping them.

MR. COLE thought it not necessary for the place to be damp to insure the keeping of apples.

MR. BROTHERS thinks if water is kept in the cellar, apples will keep a great deal more cold.

MR. STEVENS thinks one man should gather fifty or sixty bushels per day. Thinks a ladder should be used in gathering the fruit.

J. W. GOSS thinks the question cannot be satisfactorily answered, as the amount picked depends on the man, the apples, etc. His man was not able to gather more than eight barrels per day.

MR. FORBES had a man gather forty-five to fifty bushels a day.

The President finds quite a difference of opinion as to the amount of apples one man is able to gather in a day.

MR. GOSS thinks not when you consider the time it takes to put them in the barrel, and he also thinks the Society should adopt some standard package for shipping apples.

The President notifies the Society that the matter will be considered later.

MR. PERKINS gives it as his opinion than a man can gather twenty-five bushels in a day.

The President considers twenty-five bushels a fair day's work for a man to do justice to the fruit.

MR. LEYNOR hold that the old-fashioned way, with a common grain sack and a stick across the mouth, the best.

MR. BROTHERS uses a grain sack cut in two and carried over the shoulder, leaving both hands free for work.

MR. STEVENS is puzzled to know how a man can use both hands to pick with and hang on to the ladder.

MR. BROTHERS says his apples are not intoxicating.

MR. GOSS wants to know why the apple keeps better some years than others.

The President has an idea that the way of picking has much to do with the length of time that the apple will keep.

MR. COLE did not gather his apples until just before freezing up time came.

MR. PERKINS gathered his apples just before freezing up time came in the fall, and put dry leaves among the apples, and in that way keeps them until apples come again.

MR. BROTHERS gives it as the opinion of MR. CORNFORTH that the apple should be gathered before it is fully ripe.

To the President, Officers and Members of the Northern Horticultural Society:

The undersigned begs to make the following report:

| | |
|--|----------|
| Cash on hand at last report | \$ 11 25 |
| Cash received from Secretary | — |
| Balance on hand to date | \$ 11 25 |

All of which is respectfully submitted.

I. H. DICKSON,
Treasurer.

EVENING SESSION.

After the opening of the evening meeting the Committee on Nominations reported the following persons to fill the offices for the ensuing year:

President—J. W. Goss.

Secretary—E. S. Housel.

Treasurer—Jas. Ackerman.

Executive Committee—C. S. Faurot, Judge Osborn.

Report adopted.

"Pruning and Cultivating the Orchard," by DAVID BROTHERS.

ADDRESS OF WELCOME.

I find the following lines in a very old Book with which men are all too little familiar: "And the Lord planted a garden, eastward in Eden, and there he put the man whom he had made, and out of the ground made the Lord God to grow every tree that is pleasant to the sight and good for food. And the Lord God took the man and put him in the Garden of Eden, to dress it and to keep it." A good text, is it not? But I am not

going to preach you a sermon if it is—although a good sermon would not hurt the very worst of us. I have read it to show you that Adam was a horticulturist—the first of a long line of a brilliant succession. He found his fruit trees made ready to his hand. You did not find it so here; but that was Eden—this is Colorado.

If we would learn what is man's highest and best calling—the calling that brings him nearest his Maker, let us seek that knowledge by the study of man in his purity, ere he had lost his first estate of innocence. Adam was not a lawyer or a doctor, let us all be thankful. He was not a merchant, for which some of you may be thankful. He was not a railroad king or electrician or capitalist—not even a preacher nor yet a farmer—but he was a horticulturist; so, gentlemen of the Northern Horticultural Society, I congratulate you that you have in some measure been able to make this your calling, and let me congratulate you further that the tree of knowledge no longer grows forbidden fruit.

I said this was Colorado, and if there is any country on earth the organizing of which was so utterly full of discouragement to the fruit-grower, I have failed to find it, and I have traveled from the Atlantic to the Pacific more than once. Soon after my settlement in Longmont, I made the acquaintance of a prominent citizen, since deceased, who proved to me most conclusively the utter hopelessness of any attempt to grow the larger fruits. I first learned of him that hundreds of dollars' worth of apple trees had been safely carted across the American Desert to struggle against adversity for a few years and then go out in darkness, and of these hundreds of trees no vestige remained. We talked of the thousand other trees that had been shipped in and planted since the introduction of railroads, less than one-half dozen of which had escaped to tell the story. He further af-

firmed it to be his belief that even if trees could be made to live, the fruit would so deteriorate as to be worthless. He owned one of the six surviving trees which was snugly ensconced in the dense foliage of four stalwart cottonwoods. The diminutive fruit did look discouraged, while the cottonwoods seemed conscious that they had the best of it.

With this flattering prospect I planted twenty-two fruit trees. Of course I should not have had the hardihood to do this, but I had long been afflicted with that troublesome disease, "tree on the brain," and here was a chance for a cure. In order to make the remedy thorough I made the public assertion that I meant to plant a new tree to fill the place of every one that died. To-day I own two of those original trees, and they are Siberian Crabs. In some of the vacancies I have planted the second, in some the third, and in one the fourth tree, but I have kept my word for fifteen years, and that is longer than some people keep their word.

That was in the long ago—the dark ages, so to speak. This is all happily changed, and now and then we hear fruit-growers anxiously discussing the market of the future, and for Colorado fruits. A few years ago a grower said that he was tempted to plant five hundred more apple trees, and when asked why not, he said that when the trees came into bearing the market will be overstocked. I rashly agreed to take his surplus fruit. I would not dare to do that to-day. I give it as my opinion, however, that the market will not be overstocked in our day.

This change is doubtless due to improved conditions arising from a less arid condition of the atmosphere to a better understanding of the conditions—a more thorough knowledge of the varieties adapted to the climate and a mode of culture better adapted to the conditions. The

success already attained is encouraging, but much remains to be learned and to be done. Insect enemies are already making themselves felt, others will come, disease will appear to further test your courage. The best way to reach the general market, the best mode of preparation, the most suitable packages—to discuss these and other important questions you are now convened, and it is made my pleasant duty to welcome you here. This I do in behalf of the citizens of Longmont, and while at this busy season they may not be able to meet with you, as they desire, they wish you a pleasant and profitable session. It is always pleasant to welcome our friends. I try to run away when the good-byes come. So I beg of you, Mr. President, and gentlemen of the Society, you will believe that the welcome we offer to-day is as sincere and cordial as it is free and informal. To you is due much of the success in fruit culture already attained, and you are yet in your infancy. What may we not expect when you reach the estate of manhood! Again I bid you welcome to the freedom of our town and the hospitality of our homes.

At the evening session the Society got down to business in fair shape; and after music, under charge of Prof. Frazee of Longmont, the President delivered the annual address, as follows:

PRESIDENT ACKERMAN'S ADDRESS.

With the present year another volume in the Book of Time is closed, and nearly 6,000 volumes are laid away. We are about to commence the new. What has been recorded in the volume of '89, A. D.? Has there been any advance in Colorado horticulture since our last annual meeting?

While there have been cyclones, floods and failures all around us, God, in His providence, has blessed Colo-

rado with an abundance of the necessities, as well as the luxuries of life. We certainly have reason to be thankful for these things, as well as for the beautiful climate and productive soil of our adopted State. But while we have every year a good *average* crop of fruits and grains, man is ungrateful—the yield is not up to his expectation, or the prices are too low—continually fault-finding. These things ought not to be. We should much rather be thankful for our comfortable homes and pleasant surroundings.

But the question arises, Why are we here? Why spend time and money? Why not better stay at home and study the reports of horticultural societies of Michigan, Wisconsin, Iowa, Missouri and Kansas? Let them be at the expense, and we reap the benefits. Would that be right? Should we not contribute our mite to the general storehouse of information? We glean much valuable information from the proceedings of other societies, as well as from our agricultural papers; but still we do not get just what we want, even the reports from our State Society are not applicable to the state at large, from the fact that what will do for Fremont, Delta and Gunnison will not do for Northern Colorado, and the proceedings of Northern Colorado do not supply the wants of the South. I would rather hear from such men as MR. WEBSTER, MR. GOSS, MR. MCINTOSH and MR. STEVENS than anyone else, and why? Because they are practical men, and in my immediate vicinity. MR. OSBORN and MR. ALLEN would rather hear from good practical men on the Thompson; MR. MCCLELLAND and MR. HOAG from those on the Poudre. What we want is the successes and the failures of those in our immediate neighborhood, how they do their work, and the results.

The next question, Who should be here? Everyone that has a tree or a shrub or a vine, and not only be

here, but contribute his experience—yes, and his dollar. This Society was not organized to make money, but to stimulate and adopt the best methods for the fruit-growing interest of Northern Colorado. But still there are a few expenses connected with it that some one must meet. I would recommend that Section 3, of our By-laws, be so amended that upon the payment of a certain sum each member may receive a certificate of membership, and that yearly dues may be assured, sufficient to defray the expenses of the society.

And now a little digression. We will moralize a little.

Do the surroundings of the child have any influence on the man? We must admit that our characters as men and women are made up of the little things with which we come in contact day by day. Then we would infer that fruit and flowers in abundance about the home would have a tendency to take off the rough edges of the children and make them more refined in after life. The question, Are these things obtainable by all? Most certainly they are; in fact, you cannot pass a house, either in city or country, but you see a few trees, shrubs and vines; *but*, yes, I say *but*, in too many cases they are almost hidden with weeds.

An old doctor was once asked the question: What is the one great essential to good health? His answer: Cleanliness. Draw your own inference. Let us have at this meeting a short discussion, not only on thorough tillage, but no tillage, with the results. I want to be brief, but while on this subject I would like to state few undeniable facts.

It is impossible to receive something for nothing. It has been said that labor is the great lever that moves the world, and in the wisdom of God it was necessary to compel man to labor. There may be here and there

spots upon the earth where spontaneous growth furnishes food for men. But what is their moral condition? They are but little above the animal. With diligence there *may* be failures in fruit-growing; but we see failures everywhere, in all kinds of business. Labor—persistent labor—if in partnership with common sense, is the best of all antidotes for failure. Do not understand me to say all work and no play—for I think the great curse of the Yankee is over-taxing the physical and mental system—but systematic labor, well directed, is what I would impress upon the mind. Let us moralize a little further. Perhaps I can interest you as well as in any other way.

One careful stitch at a time is what produces the costly laces and fabrics that are so much sought after by the wealthy class. A little twig here and there, pruned from a tree or shrub, if carefully done, is what produces the fine orchard and the beautiful home, admired by all passers-by. A little duty done—a little kindness shown to our fellow men—lives after we are gone. So the beautiful tree and shrub are handed down to the next generation. We should ever bear in mind one fact: We are to pass through this world but once. Let us strive to do our whole duty to our God and to our fellow-man, by doing our work carefully and well.

After the President's address, which received close attention, and the report of the Treasurer, PROF. FRAZER sang "Nothing but Leaves," in his best style, much to the delight of his hearers.

MRS. C. D. H. THOMPSON was then announced, and spoke as follows:

FLORICULTURE.

While, perhaps, we may not say that floriculture is the proof of culture among nations and individuals, we may safely say that the cultivation of flowers tends to both moral and æsthetical culture. The good God has made and placed us in His world of beauty and wishes us to enjoy ourselves. The only question is, what constitutes enjoyment?

A young woman may think she is getting the most out of life by compressing the waist and pinching the feet, and with humped back and stilts under the heels she secures the needed exercise and recreation at the all-night dance or in other unhealthful excitements. A boy thinks he finds enjoyment in puffing the poisonous cigarette, and both men and boys spend hours in saloons listening to the vile talk and drinking the vile poisons, and thus enjoy themselves.

There are scores of frivolous men and women in the world who are filling their lives with enjoyments not one of which tends to the uplift of themselves or anybody else. And there are many hard working men and women into whose lives no beauty comes. The sun rises on the hills in the East, and we note it not; sets in the West, and as if God would compel recognition of the gorgeous sunset, He lingers in golden light on the tops of those mountains, but we have no time to look or admire.

We should let these things come into our lives. Enjoyment in the highest sense is that which not only pleases the senses, but which tends to an uplift of soul as well. We all know the beautiful mission of flowers. You have read, yea, even known, how often the half starved little one in the cold garret in the large city has hugged the little blossom, pansy or rosebud to its breast

even when dying. Yes, flowers speak to the living and comfort the dying. It has been told of a woman's prison in Massachusetts, and this prison is managed entirely by women—a wonderfully wise woman being at the head—that when rebellious looks and acts are noticed among the prisoners this matron sends out for a bushel or more of Pond Lilies, and as the women leave the dining hall she stands in the door and gives into the hands of each one of these beautiful flowers, and the evil spirit and passions are subdued.

I know I am speaking to intelligent men and women, a body of farmers, and I know well what is said of this class of people. I know it is said all the good and great men come from the farms. Do you know I almost believe it? I am sure the great and good women do. The thought has been expressed that only the country and farm could produce such a peerless woman as Frances E. Willard; that on that Wisconsin farm was laid the foundation, physically and mentally, which has made it possible for her to do what no other has ever done—deliver one address a day on an average for ten years. At a recent convention of the National W. C. T. U. a woman who is a firm believer in woman said it had been remarked that men were made coarse by their business, and woman must be secluded and refined, thus boys might be boorish, girls must be gentle. "If," said she, "the sweet ministrations of home and the care of little children tend to develop angelhood, women by taking their share of public duties must give men their part of these excellent opportunities. Woman must not monopolize the means of grace." And we believe woman should have some of the outdoor work or some of the hours out of doors and men should not monopolize this means of good health and sweet temper. And floriculture offers just the opportunity needed. I

hold that every man or woman, boy or girl, is better and happier because of time spent in the cultivation of flowers. It is good for body and good for the soul. It is a sure cure, my sister, for headaches in the spring and a wonderful antidote for that dread disease of our women to-day, "the nerves."

Plant a bed of pansies—you will get more real enjoyment out of it than from your melon patch. Your boys and girls will, I know, and I know a boy's capacity for melons, too. Late in the summer I took some friends from the East out west a few miles to show our nice fruit, or your nice fruit, rather. Our brother and sister, where we went, were away, but we were asked to go in the orchard and pick up some apples. There was a bed of old-fashioned flowers one side the path from the gate to the house, and as we drove home, munching apples and pears, one of my friends said: "I should be perfectly happy if I only had a few of those flowers;" and when I saw her, in Chicago, the other day she said the same thing. Flowers appeal to a peculiar sense. It has been said a "Love of flowers is a love of the beautiful, and a love of the beautiful is a love of the good." No spot on the farm will grow so paying a crop as the little parterre devoted to flowers. If it does not pay in golden coin, it does in all that makes life worth staying here for.

DISCUSSION.

In answer to a question MRS. THOMPSON said that the Pansies should be started in boxes. "The potted plants," she said, "should be put out early, so that they may have good opportunity to grow. Plant Sweet Peas, Pansies, Hollyhocks, and the other old-fashioned flowers our mothers loved."

MRS. CARR: Speaking of Hollyhocks reminds me that a friend of mine who keeps cats and Hollyhocks,

plants the latter in long rows, and thus has blooms during a large part of the season. .

PRESIDENT ACKERMAN: We plant our Pansies in the Fall. We keep our flower seeds in separate packages; but when we come to plant we mix the seeds and have very good results in flowers of many colors. Flowers have a softening influence. I think God breathes through flowers. How desolate the home without flowers.

S. W. COLE: My wife raises flowers. When some one asks her if it pays to spend time with them, she said: "Think how many glad hearts I can make with them."

MRS. O. A. MCFARLAND: I have always loved flowers. They have a refining influence. One of my little daughters as she came in from the flower-bed, said: "I do love flowers; they seem to talk to me."

MRS. BACON: I plant in boxes, preferring them to open beds.

DAVID BROTHERS: Flowers have done me good many a time when I was tired. I have loved them ever since I was a child. My mother taught me to love them. I thank God for flowers. They uplift and cheer. I use the little flower pots, and plant a few seeds in each. I thus give them a good start by the time the frosts are past. My farm used to be called "Hollyhock Ranch," I had so many of those flowers.

E. MILLESON: I would be glad to add my mite in favor of the little beauties. Children and flowers make the heart glad. I have seen more enjoyment at our house, resulting from flowers than from anything else. I find that the flowers bring real happiness. I once saw our English brother [DAVID BROTHERS] standing by a bunch of Hollyhocks, and since then have had a good opinion of him.

C. S. FAUROT: Would it not be a good thing to express our preference for a national flower? I think the Golden-rod the proper one.

MRS. BACON: The greatest reason in favor of the Golden-rod is the fact that it grows all over the country. Many beautiful flowers are only local. We want a flower that is beautiful and national in distribution.

COL. CARR: The Sunflower meets those requirements and is fully as fragrant.

MRS. THOMPSON: If I lived in New England I would want the Trailing Arbutus.

At this point the President called for music, and MISS HATCH favored the Society with a song; and after some further discussion, during which MR. BROTHERS remarked that the quince is a success in the Southern part of Colorado, noting the fact that JUDGE FELTON, of Cañon City, raises good ones, MISS CHAPMAN sang "Annie Laurie."

The Society then adjourned.

WEDNESDAY MORNING.

At 10 o'clock Wednesday morning PRESIDENT ACKERMAN called the Society to order.

Prayer was offered by REV. W. O. THOMPSON.

A paper on the "Best Five Grapes for Colorado," was on the programme, to be read by J. S. MCCLELLAND. MR. MCCLELLAND was absent. His paper, however, we are able to print in its proper place.

BEST GRAPES FOR COLORADO.

It is questionable if any two horticulturists of our State, men who have had several years' experience in grape growing would agree as to the best five varieties to grow here, or even as to the best two. Our climatic conditions are peculiar; our seasons are short; soils and exposures differ; care, pruning and training are not alike; tastes vary exceedingly; the purposes for which we grow fruit are dissimilar; some varieties keep better than others. The color and appearance of some render them unattractive and difficult of sale. Others too late in ripening. Many of the earlier kinds drop from the stem before they are thoroughly ripe. Others are sour or insipid. Now, all these things, as well as many others, must be taken into consideration before recommending any varieties to a confiding public.

As a rule, I believe fruit-growers favor white grapes, while the buyers, the general public, seem to much prefer the black; and the red fruit is the second choice of both classes. Then to those who grow for sale, the commercial growers, the great bulk of the crop should be black, and the variety best known and mostly preferred is the Concord. This variety being one of the best growers and bearers, and to the uncultured taste an excellent fruit, stands, undoubtedly, at the head of the list both for home and commercial purposes, and will probably be recommended as the best grape by fully nine-tenths of our people—at least of those who prefer our American kinds to the foreign or California varieties, as they are better known here. As the others of the five will probably be disputed by some (or all) of those present, let us take a look over the kinds we have to choose from before naming our preference.

The past season I have fruited the following kinds, and the most of them for a number of years, so I shall speak only of those I have tested on my own grounds. Let us then consider a few of these varieties, commencing with the blacks, and taking them as near as can be in the order of ripening.

BLACK VARIETIES.

Champion, or Talmen, a vigorous grower, fair bearer; but the fruit is sour, and liable to drop from the stem. To commence marketing with this third-class fruit injures the sale of your other grapes throughout the whole season.

Janesville is not so strong a grower as the former, and the berries and bunches are smaller and fruit just about as sour.

Moore's Early, not a strong grower, but a good bearer; berries large and of excellent flavor. By long odds the best very early black grape I have yet fruited.

Hartford, a good grower and bearer and a fair fruit, but sometimes drops badly.

Worden, with me, is not a good grower, but a good bearer; bunches not so large as Concord, but berries larger. The fruit is of a finer flavor than that variety, and from ten days to two weeks earlier.

Telegraph, an excellent grower; very prolific, and fruit of good quality, but is liable to drop as soon as ripe.

Concord, the grape for the million. The most popular grape both with growers and buyers. Where it has warm soil and proper exposure seldom fails to ripen when properly pruned and trained.

The Eumelan is a good grower and very prolific. The berries are not so large as Concord, but of much finer flavor to my taste, and as it is a descendant of the

wild frost-grape, the fruit is not injured by quite a severe frost, such as we had in September last. A most promising grape for Colorado. If it does as well for me hereafter as it has for the past few years shall feel like placing it at the head of the list.

August Giant, a most rampant grower, excellent bearer and fine flavor.

Clinton, a vigorous grower, but not a good bearer. The fruit, however, is so sour that the less it grows the better.

RED VARIETIES.

Among the first to ripen is the Massasoit (Rogers' No. 3); a vigorous vine, fair bearer, and the fruit sweet and of good flavor.

Brighton, very vigorous, healthy vine, but not as yet very prolific with me, though of fine flavor.

The Diana is a fair grower, and quite prolific; has a very peculiar musky flavor, and is one of the best of keepers.

Perkins, a healthy, rather strong grower, fair bearer and of good flavor; ripens unevenly, some buds coloring up quite late.

The Delaware with proper care makes a good growth, is a fair bearer, and the fruit is the standard of excellence, generally bringing twice the price of other kinds. One of the handsomest of grapes.

Argarvam (Rogers' No. 15), a vigorous grower, fairly prolific, and of fine flavor. The berries are very large, but ripen a little late.

Concord-Chasselas, vigorous grower, fruit tender and melting; berries large and sound, very promising.

The Salem is a rapid and strong grower, fair bearer; berries large and of good flavor.

WHITE VARIETIES.

Lady, not a strong grower; fruit very early and of excellent flavor.

Martha, the white Concord, grows well and is a heavy bearer, but like some others of the so-called white grapes, is frequently of a dirty green color, and looks unattractive to the buyer.

Sweetwater, a foreign sort, a vigorous grower and a very heavy bearer; bunches very large, sweet and of fine quality for the table. With me, by all odds, the best white grape.

Chasselas, not so good a grower as the former, but of excellent table qualities.

Muscatel, also a foreign sort, a fine grower. The bunches and berries are both very large and handsome. Some of my vines although bearing for the first time this year, produced bunches weighing nearly a pound each. It is too late here, however, for us.

The Pocklington has not proved to be a good grower with me. Here it is growing beside the Salem, which makes a growth of twenty to thirty feet while the Pocklington scarcely attains more than five or six feet. It is a good bearer and of fair quality, but is not such a fruit as we had a right to expect by the flourish of trumpets which brought it into view. It is very late.

The Noah is a rampant grower, fairly productive. The berries are of medium size, of a dirty green color, drop badly and the flavor is poor. Should evidently not have left the ark.

Such are some of the varieties I have been growing and watching very closely, and from which I am asked to make a selection of five. While it may be well enough to thus select a few kinds from the little experi-

ence any of us have had, yet three, two or even one years' further trial may very decidedly change our views regarding varieties.

Concord is the most popular grape and must, of course, head the list, and as the Delaware is the standard of excellence and generally satisfactory as a grower and bearer, must not be omitted; next I would place the Sweetwater—the three making a collection of the colors—two heaviest bearers and one of best quality. The other two might be Moore's Early and Massasoit, giving us the best, very early, of both the blacks and the reds.

In addition to these there are three others which should not be omitted: the Eumelan, the Worden and the Brighton. Should I have included either two of these kinds in the list of five we should have had none of the very early sorts, which would have been an omission such as would have much detracted from its value. Eumelan I have not had sufficient experience in fruiting to recommend it unreservedly to others; while the Worden and Brighton have not done as well with me as I understand they have with others. For these reasons I have not placed them in the select list, but do not feel justified in passing them by without notice.

Let us now understand that the grape needs a warm soil, prefers a southerly exposure, must have good drainage, either natural or artificial, needs thorough cultivation, will do poorly among weeds and grass, and will give little profit or satisfaction if left to run on the ground like a plebian pumpkin or squash. Careless or pre-occupied mortals should plant the latter and leave grapes to those who will heed their needs.

As to water, the grape needs but little after the first year. Along about May or June they need an irriga-

tion, as they also do when the fruit is filling out. After this keep the water off. The idea that they should be watered after they have commenced ripening, I think is a mistaken one, and only retards that event. Early ripening is extremely desirable as it generally insures better prices and gets the fruit out of the way of the frost.

In closing, permit me to advise all who will take care of the vines to plant at least a few grapes, as there is no more delicious or wholesome fruit, nor one which will better repay the care given them.

DISCUSSION.

C. S. FAUROT was called upon to open the discussion. He named the Concord, Moore's Early, Hartford Prolific, Delaware and Salem as the best black grapes, and added the Pocklington as the best white grape.

Question—Is there a real white grape?

MR. FAUROT: Yes; the Pocklington is a white grape. It is a seedling of the Concord. I do not think grapes need covering to prevent winter-killing. If you cover, do it to maintain vitality. My grapes were full of clusters last spring, but the frost destroyed most of the fruit. The Niagara is a green, not a white grape. Not long ago I heard of a man who bought Delaware grapes, and when they fruited the grapes were black. The man who sold the vines explained this circumstance by saying that it was the black soil that gave them the unusual color.

On a high sandy soil they would have the proper color. The leaf-hopper seems to thrive on the Clinton more than on others. I use lime to destroy it, dusting over the vines. I would recommend that all rubbish be kept out of the vineyard. I prune about four times

during the summer, keeping out all needless wood. Do not remove leaves, so as to expose the fruit. My vines are in rows six feet apart, the vines being seven feet apart in the rows. I never let one vine infringe on the other. I use wires to train on, and shall lower them next year. I tie to the wire in spring, and during the summer as required. Keep the quirls off during winter. Do not tie close to wire in winter. Better leave grapes entirely exposed than to cover lightly. It is the dry winds, not the cold, that kills our vines, blackberries and grapes. I trellis on the fan principle and aim to keep the vines as near the ground as possible. Bring the full end of the vines as low as where it leaves the crown and it will bud evenly; this is the German plan. We must prune so as to mature our wood in three or four months. Our hot sun and dry climate must be guarded against. Naturally the tops bud first to the detriment or death of the lower buds. This must be guarded against. The Concord is long jointed, but this can be prevented by summer pruning. I pinch off the wild wood which gives the fruit-bud additional strength. I never prune after the first of August. The fruit-bud is formed in the fall, and must not be forced too much, else it will blossom in the fall. When the old vine gets damaged near the bottom, by layering grow a new vine, and dig up the old one. Bury only a part of the vine.

J. W. Goss then read the following paper:

IS FRUIT GROWING A FINANCIAL SUCCESS.

Permit me to say at the start, that I thought, and still think our Committee on Programme made a great mistake in giving me this subject for this occasion. Indeed, I should not have consented to take it, only I fully believed that I could procure a substitute to treat the

subject for me; but every effort to procure one has failed. This question should be answered in the affirmative by a big, round, ringing, *Yes*. And to have it thus answered it should have been given to some one of our many nurserymen—those who have trees to sell, some of those fellows who come to your humble homes with those beautiful picture books showing fruit “life size, you know,” all warranted hardy, and to be loaded to the ground with fruit, so perfect as to discount the pictures shown within two years after planting out; but as I have not a vine or tree or plant of any kind to sell, and not a thing to influence me in either direction but the cold facts found by experience, and those gathered from neighbors and others growing fruit in Colorado, I can not answer it as it should be answered on an occasion like this.

I am not answering it as a fruit-grower; for your committee knew well before they gave me the subject that I was not one, only a farmer—one who grows fruit, as the most of you will grow it, as a part of the business of the farm. It has not been a financial success. Why? There are several reasons. Fruit can be grown here in great abundance, and of excellent quality.

THE STRAWBERRY, KING OF BERRIES.

Of all God's gifts of fruit to man, the best—first in bloom and first the home to bless. It seems to those of our Eastern friends who have failed to make its growing a financial success for lack of water, loss by drouth, that we had a bonanza—pure water, plenty of it, and at our command, just how much and when to apply. All true; but with our water as it comes sparkling amid the rows come million of seeds of grasses and weeds, all ready to grasp the soil and bound into life in a moment almost, so that in a day's time your beautiful rows of berries are transformed into a sward, for the tiny seeds are every-

where, and your prospects are better for a pasture than for berries.

Hoe and fingers are now the only salvation. These cost money, and in Colorado much money. Long before the berries are ready the hire for help has a large mortgage on them for pay. In answer to the query, "Does it pay to grow fruit in Colorado?" the reply from fruit-growers has in every case been: "Wages are too high; it doesn't pay." Reason first—Then wages are too high. It doesn't pay. Reason second—As one of our fruit men writes me, "God Almighty has given some other countries from six weeks to six months more summer and sunshine than Colorado, and we can not successfully fight him," so those who are thus favored will win while with us it will not pay. Reason third—With our present railroad laws distance is annihilated—ignored. The long haul may be, and generally is, as cheap as the shorter one, or in other words, the California and Texas fruit can be, and is, placed in your market at the same cost as your own.

When all of these are combined and a fourth added, viz: that our commission men push the foreign instead of the home grown, and many others that might be added, such as hail, frost and snows late in spring, and floods such as destroyed the crop at Boulder last spring, and others, so our fruit men foot it up only one full crop in six years. I think I have fully answered when I say that without an exception, so far as I know, those who hired money to go into fruit-raising have either lost their homes or are paying interest on the investment to this day. It has not paid, and for the given reasons it will not pay.

Other fruits of the berry family are all in the same line. What is true of the strawberry is equally true of all the others, with the added expense of burying for

winter. This must be done or no fruit or even canes will mark the spot where once they grew.

Apples, pears, and most of the tree fruits grow well in some locations in Colorado. Especially is this true in my neighborhood. I have in my orchard five or six hundred trees in fine condition, except for breakage from the late snows. I have grown twenty-seven varieties of apples, all seemingly perfect, from the delicate Fameuse or Snow to the hardy old Ben Davis, well loaded with fruit year after year. They began to bear five years after setting, and so far as we know may so continue. But even then, after counting cost of trees, labor, codlin moth, and last, though not least, the bummer's share, and other enemies, I have not made it a financial success. One of the reasons has been, we have no market. Our home market is a snare and a delusion. The foreign article is taken by your dealer at a higher figure than your own, though an inferior one.

So soon as you go to Denver you come into competition with the cheaper labor of Kansas, Nebraska, Missouri and Michigan. When you have done this as I have, you too will come to the same conclusion that fruit growing is not a success financially. If the fruit growers would unite, not to put up the price, but to grade the fruit for the market, and so hold the market as to maintain a living price, and join with the farmers, wheat growers, potato growers, cattle growers and all others in a commission house in Denver, strong enough to push your products into our markets alongside of the foreign, it can be made to pay. Fruit for the family should be grown, pay or no pay. It takes the place of doctors' bills, and will pay.

I don't wish by this epistle to discourage any one from going into the business; but I have written more to provoke discussion, knowing full well that my opponents

in this hall are largely in the majority and that the other side will be much better presented.

DISCUSSION.

MR. ROBBINS: I have not been able to get Colorado apples in Longmont.

MR. MILLESON: I had to pay \$5.00 to \$6.00 a barrel for Colorado apples.

MR. FAUROT: I know something of strawberries. This year one acre of strawberries netted me \$164.00. On my blackberries I made \$382.00 per acre. From two acres of grapes I cleared \$200.00. I claim that there is money in small fruits. If it does not pay to sell apples here, send them to Chicago. Our Colorado apples will sell for \$6.00 a barrel there. I do not understand why our apples do not sell well. We must pick them, not shake them from the trees and shovel them into a wagon. They must be handled carefully. The farmers should organize. Keep prices up—not too high; a reasonable demand is not unreasonable. The merchant fixes prices on the farmer's products and his own. It doesn't pay to grow currants and gooseberries. The currant is not appreciated. It does not pay to pick it. I do not deal with commission men. The J. M. Clark Commission Co. is a good institution and should be supported. But commission men want to sell for what they can get. I ship my berries and get good prices. I sold one hundred baskets at 50 cents when Kansas grapes sold for 35. The law should allow me to inspect the commission house's books. I make commission merchants agree to net me a given amount. If every man who sells fruit would take due care in picking he should be able to demand a certain price per box or pound. There is one trouble with fruit picking: you must keep the codlin moth out, and pick carefully and sort. I handle every

box that leaves my place. Make everything as good as it looks.

MR. COLE: MR. STEVENS had a Brighton growing over a shed on which there once seemed to be a couple hundred pounds of grapes. I want to inquire if it is alive.

MR. STEVENS: It is alive and unprotected. There were about seventy-five pounds of grapes on it.

MR. COLE: Everybody should take care as to the looks of his fruit. MR. MCCLELLAND sold apples for ten cents a pound when California apples sold for five cents. It was the color.

MR. GOSS: The trees die; there is an element of cost. There is not a healthy crab tree in the vicinity of Greeley. They call it blight. It is coming this way. My brother's trees are dying, and he is a better farmer than I am. Mine may die next.

MR. FAUROT: That flood that gave us such a black eye at Boulder did not do the damage it was said to have done. I lost twenty-five dollars; MR. WOLFE about one hundred dollars.

MRS. J. W. GOSS then read the following paper on

CANNING, PRESERVING AND DRYING.

The cost of living on the farm depends largely on the proportion of articles consumed that are grown at home, and any farm may be made to produce all the small fruits, at least, and vegetables required for the use of the family.

The importance of fruit as an article of diet is generally conceded, and when grown at home is not, as some are inclined to think, an expensive luxury, but is an

actual saving in the butcher's, grocer's and doctor's bills. So healthful and economical is fruit considered at our home that it is seldom wanting for even one meal. In this State a supply of fresh home-grown fruit may be had from the first of June till the first of November, and those of you who are so fortunate as to grow apples can have fresh fruit nearly or quite the whole year.

However, there are many farm homes not liberally supplied with apples, so from November till June the table must be furnished with fruit preserved in some manner, and this brings us to our subject of preserving, canning and drying.

Although the present method of preserving fruit by excluding the air has been known to the modern house-keeper but a few years, the art is not new. Mrs. Savery, of Boulder, and Mrs. Wild, of Loveland, have both told us at former meetings of the Horticultural Society, of the finding of canned figs in the excavations of the ruins of Pompeii, the method appearing to be the same as at the present day, that of heating the fruit and expelling the air, then sealing tightly.

Sugar is not a necessary requisite in keeping of canned fruit, but as the cooking of the fruit with the sugar makes the former more palatable, and as it is said that chemists have demonstrated that "in filling certain requirements of the human body, one pound of sugar is equal to three pounds of beef," why not use the sugar, unless it be because the price of the article advances at the beginning of the canning season.

The entire exclusion of air from fruit is necessary for its perfect keeping. Jars and rubbers must be perfect. Glass jars are best, of course, and most convenient. A supply of new rubbers every season will doubtless save more than their cost in fruit.

It is recommended to partly fill the jars with warm water, screw on the tops, turn upside down and let stand a few minutes to see if they leak. If they do not, be careful to keep fitted covers with their respective jars. The beauty of fruit not crushed during the process of cooking or handling is the delight of some housewives, but I confess to not having been successful, as a rule, in that respect. My fruit will go to pieces. One writer who claims to have canned fruit for years with unvarying success, gives her method of keeping it whole. She never uses over-ripe fruit. After carefully preparing her fruit she puts it immediately into the jars, having first placed the rubber on the can with its fitted cover near. The sugar is dissolved with just enough boiling water. Pour the syrup over the fruit in the jar, filling up with warm water if not quite full. Loosely screw on the tops and place the jars closely in a deep porcelain kettle or a wash-boiler. Fill up the boiler with water as hot as can be borne by the hand to within an inch of the top of jars; then set on the fire to boil, care being taken not to heat too fast, if the boiler is thin on the bottom.

Ten minutes boiling is usually sufficient for berries, but larger and more solid fruit requires longer time. The fruit can be tried with a steel fork. When cooked, set back and tighten covers. Besides the fruit remaining whole, she claims that as the aroma cannot escape the flavor is better.

I have canned sweet corn in like manner, and had it keep very nice. Simply cut the corn from the cob, pack closely in jars, put on the tops, and boil several hours in a boiler of water, with a little straw placed under the jars. Be sure to cook thoroughly and it will not fail to keep. Tighten the cover after taking out of water.

My method of canning currants is, after having picked them over, washed and drained, to mash them

well with an equal amount of sugar, and seal without heating. When opened they have the flavor of fruit just gathered.

Preserves depend entirely on the sugar for keeping; but since canning is so much in vogue, and the fruit thus kept is considered more wholesome, not so much preserved fruit is found on the table as formerly. My own experience on this subject and that of drying is scarcely worth mentioning.

Most agricultural papers and ladies' magazines contain a department for domestic economy, in which many valuable recipes are given for preserving fruit.

I should be glad if I could give you some new and tried recipes, but as I cannot, will leave the subject for discussion.

DISCUSSION.

The question was asked if it is possible to can sweet corn successfully in this high altitude.

MRS. GOSS and others had been successful.

D. W. WORKING: Would it not be wise and economical to preserve fruits by sealing the jars with cotton instead of using the common method of sealing? It is agreed that it is not the air that causes molding. If the germs that cause mold or putrefaction are excluded—and cotton will exclude them—the fruit will keep indefinitely.

MRS. GOSS: I tried one can of grapes, sealing it with cotton. The grapes spoiled.

MR. COLE: My wife tried the method of sealing with cotton. She used several kinds of fruit, and all kept well. It is necessary to use care in order to have the jar and its coverings free from germs of mold. But this must be remembered—mice will eat through the

cotton if given a chance, and then the fruit will spoil. Our experiment with cotton in sealing fruit was a complete success.

After dinner MRS. B. L. CARR read the following paper on

DOMESTIC MATTERS.

This subject suggests so many things connected with the home life that I have been at a loss to know in what part of the domestic world I could find a topic on which to express myself interestingly or make suggestions which might be worthy of serious attention. Though the question of domestic service is somewhat foreign in the domain of horticulture, yet it is a problem in which all households are more or less interested, it may not be amiss to discuss it at this time, when the home and surroundings are receiving so much attention. The increase in wealth, the rapid changes which are going on in the social world, our fine dwellings, mode of living, and style of dress have made the household cares greater and our social duties more exacting. Consequently there is more demand for help in the house and the domestic becomes a necessary factor in the home.

The newspapers of to-day caricature the foreign help in our cities as making such demands of the mistress of the house, that the lady herself is the one who seems to be placed in the subordinate position. Though this shows the ridiculous side of the question, yet there is an undercurrent of truth in these jokes, which proves that the ignorant foreigners who swarm our shores are becoming a power, if not a terror in our homes.

Yet many of our American families prefer any of these uncouth foreigners to an American in their kitchen and nurseries. This class of foreigners have always

been subjected to more menial work and less of social equality than Americans of the industrial class, and these reasons have an influence with the mistress of the home in our large cities in the selection of her help. Our American girls look with disdain upon housework, and if obliged to depend upon their own labor for support, rush to the cities and towns to obtain clerkships in stores and shops, where they earn barely sufficient wages for board and poor but showy clothing. Yet if these girls were offered a position with ample compensation in the home of any well-to-do family where kitchen work would be a part of their duties, they would not accept, on the ground that they would be looked down upon by respectable people.

Whence arises all of these false notions in regard to honorable labor? Time was, when a girl who wished to support herself and had health and strength, never hesitated for a moment to go out to domestic service, nor did she lower herself in the social scale by so doing. She was not considered a menial, but what she really was, a "helper." And why should not this be so now? Why should any woman or girl of character be thought lower in the social scale because she works in the kitchen, makes good wholesome bread, rolls the flaky pie-crust or preserves the delicious fruit. This may be the "floury" side of the kitchen work, but the girl that can do this and do it successfully need not hang her head if she be called a "hired girl," or think that she has lost her self-respect. Any labor that is needful for mankind is equally respectable, and the maid in the kitchen who has worth of character, is equal in point of respectability to the mistress who rules over her. It is intelligence and character, not wealth or station, which makes us equal socially.

The rank is but the guinea's stamp;
A man 's a man for a' that.

There is one suggestive thought that Edward Bellamy puts forth in that Utopian book of "Looking Backward," and though he speaks from his standpoint of a century hence and looking back to our time, yet it is quite applicable now. "That there is among us such a boundless supply of servants"—serfs he calls them—"on whom we impose all sorts of painful and disagreeable tasks, which make us indifferent to devices, to avoid the necessity of them." The true housewife will have due consideration for the feelings of those who are in her service, and will never hesitate to show her appreciation of their well-doing by kind words and a thoughtful care for their welfare. A very important consideration in domestic service is the association of our children. If we employ the ignorant and uncouth, whether it be in the kitchen or on the farm, will not our children often copy after them in many of their evil ways? The farmer who hires a man of bad habits and allows his boys to associate with him, must exercise a watchful care over them or he will have no need to wonder in after years where or when the seeds of the wild oats were sown that gave such bountiful harvest as his boys grew to manhood.

The woman who gives openly to charity and travels long journeys to attend a woman's congress for the elevation of womankind is often blind to the mission work in her own kitchen. Elevate the standard of the domestic; do not consider them only "hewers of wood and drawers of water."

What a state of happiness we should have if that era could dawn upon us now that Bellamy so happily pictures has dawned for womankind in the year two thousand, where housekeeping, sewing and mending have become co-operative; "where all are social equals, whose equality nothing can compromise, because service is honorable in a society whose fundamental principle is

that all in turn shall serve the rest;" where "we choose houses no larger than we need, and furnish them so as to make the least trouble to keep them in order."

If this were so then might the housewife rejoice; then the vexed questions of the kitchen would be solved; then might our attention be given to the delights of floriculture, by which the heart is made glad; then might body and mind be fitted for the enjoyments of earth, and heaven then; but why moralize? Then would be woman's millennium.

DISCUSSION.

J. W. GOSS: That's the trouble. When you have a perfect paper there is no discussion. But where can you get an intelligent American girl to stay with you? I can not find them. The aristocrats look down on us grangers.

MRS. BACON: I think MR. GOSS was wrong. I feel just as good as any one—if I am as good and intelligent.

THE PRESIDENT: I think, though I am an old Dutch granger, I am as good as the President of the United States. If I am gentlemanly that is all that is necessary. Labor is the lever that moves the world.

MR. FAUROT: It is hard to get an American girl to stay in a family. The girl that is fit to prepare food for me is fit to sit down and eat with me. So with the man who works beside me. The first man—Adam—was a horticulturist.

D. R. EMERY: I think false notions govern this largely. Industry, mind and ability should have preference, but we reverse this rule. We look up to the man with the soft raiment, and pass by the man of worth who labors.

ED. HOUSEL: The children of this land, if given the chances they should have, would stay with the farm. The boy who is given a calf at twelve, if his rights are respected till he is twenty-one would have property enough to start a farm. The girl the same.

P. A. LEYNER: We usually go where we can do best. The boy who goes barefoot on the farm sees the town boys better dressed than himself. I don't blame the boy who goes to town to better his condition. With a capital of \$25 he can start a peanut stand and make more money than on a \$5,000 farm.

MR. MILLESON: I happen to have some boys. We live where we lived twenty-six years ago. The town moved to us. My boys stay at home. They have all the chance they need. They go as they please, and come when they wish. But I am not ashamed of the scoundrels yet. I know where to go to get something done. Much depends on the child. There must be something to build on. I have seen rag-muffins make good men, and some who have the best chance go down.

MRS. BACON: Is it as respectable a business to run the peanut stand as the \$5,000 farm.

MR. MILLESON: It is the man, not the calling, that makes respectability.

At this point PRESIDENT ACKERMAN announced a recess, which was spent in a social and business way, some getting acquainted and some settling with the Treasurer. When the Society was called to order a general discussion was had on the proper location for an orchard.

THE PRESIDENT: Is it necessary to have friable land for an orchard, MR. ROBBINS?

MR. ROBBINS: No. I think it pays to raise apples. Plant on the northern slope, if you have one. I have

had to buy eastern fruit when I wanted Colorado fruit. Let a place be established specially to sell Colorado fruit.

MR. PRESIDENT: When you climb a ladder you begin at the bottom. We must begin at the first step to grow orchards.

MR. BROTHERS: I have planted orchards in most forms I can think of. First, I planted seventy-five trees on a south-eastern slope. I have planted on all slopes. I know no difference in the trees; and yet I prefer a northern slope. The soil is essentially the same all over the farm, the southern slope, perhaps, having more clay. I do discover a difference as regards wind. All my trees lean toward the north-east. At Greeley, I think the trouble is with the irrigation. The land as it fills with water sours, the tap-root being drowned. MR. GIPSON planted some three-year-old trees, which I afterwards found had rotted several inches. The trouble I think is sour land. I have trees on a sandy loam, where they grow fastest. In clay more care is needed. I plant by plowing furrows outward, leaving a ridge in the middle; then I run on water a few days, and later when it gets dry enough run the sub-soil plow as deep as a four-horse team can draw it. If trees get water enough, I think they will do well on a gravelly soil. JUDGE FELTON'S orchard at Cañon City is the best I think, and is on sandy loam.

MR. MILLESON: Plant your trees so they will get the first morning sunshine. I would have a north-east slope for my orchard. The best soil slopes to the north-east.

MR. GOSS: In our neighborhood fruit seems to do equally well on all slopes. My orchard slopes in several directions, and I discover no difference. I am a blacksmith, and I have a shop under a Cottonwood. I planted a Ben Davis two feet from the Cottonwood, and it bears. This tree does as well as any others.

MR. BROTHERS: If I had no good land I would plant an orchard on poor land. Have an orchard by all means.

MR. COLE: Will buds start as early on a north slope as on a south slope?

MR. BROTHERS: I have tried to retard blossoming by mulching and freezing. Tried it on Ben Davis, Red Astrachan and Duchess. There was no difference in the date of blossoming. The ground does not govern the blossoming times. It is the air that fixes the date.

MR. ROBBINS: On a north slope blossoming will be latest. Mulching will not keep the buds back.

MR. STEVENS: I see no difference. I favor a north-east slope. My trees sun-scald most on the south-east slope. The sun striking before the air gets warm I think injures the fruit.

THE PRESIDENT: MR. STEVENS' evidence is better than I can give. I could not have a north-east slope. I have no personal experience, mine being a south-east slope.

COL. CARR: Is it not a fact that the best soil for apples in the New England States is the hard, stony ground? On my father's farm was an old orchard, much of it on the best soil. One corner was so rocky that it was not cultivated. There was a tree there which I remember as a little tree and as a big tree. It was one of the best. The old apple tree thirty-five years after beginning to bear is a good tree. In this State is it not a fact that the best trees thrive on stony ground? If I had a farm in Colorado too poor for anything else I would plant it to apple trees.

THE PRESIDENT: My fathers for generations lived along the Hudson among the rocks—rough, rocky ground, which I cannot understand how those Dutchmen cleared. It is the best fruit country in the world.

MR. HORNBAKER: A rocky place may be a good one in some countries where it rains, but I do not think rocky ground is good here. You can not keep water on a rocky bottom. It dries too quick.

When I first began to grow fruit trees I had little confidence in the success of the work, and did very little pruning. I soon learned that it was necessary to prune.

Naturally the trees did not head properly and I lost many trees. Crotched trees split for me. In my later orchards I have taken pains to grow trees without crotches. My idea of a tree is that the leading stem should be ahead, with branches alternating about six inches apart. Keeping the head close and with many limbs, instead of two large forks, there is little danger of breaking by weight of fruit or snow. Taking the trees early you can make a head to suit you simply by rubbing off the buds or small limbs. I would cut off a fork at any age. If a man falls I know of but one thing for him to do—to get up. I head my trees about five feet high. My trees were loaded from top to bottom. Don't let a tree branch under four or five feet. With a high head you can cultivate. It is bad to cut off large limbs, but I would rather cut them off than to have them split. The best season to cut off large limbs I do not know. I prefer to trim in March and April; I then wax the wound, to prevent damage. I prefer good fruit to handsome trees, though I do like to see good looking trees. I trim the side limbs so as to give the tree an open head. Where limbs are thick I would cut them out, and I do not allow limbs to cross. I would rather have a two-year-old tree without a limb to plant than to have an older one with branches. I get better fruit when I keep the branches thin.

I cultivate my young orchards, raising corn in them for six years after planting the trees. In California I

noticed that the cultivated orchards looked better than those that were allowed to grow up to grass or weeds. This year I have cultivated my orchards, and kept them clean. The orchard that is thoroughly cultivated does not require half the water needed by an uncultivated one. I cultivate soon after irrigating. If I were short of water I would cultivate very freely. But to do this the heads should be high.

I do not run the water close to the young trees. I use a small stream, running it about six feet from the tree and additional furrows between rows three feet apart. I set my trees vertical. I have leaned a few to the south-west, but they now lean to the north-west.

MRS. WASHBURN: I would like to say a word in favor of sub-irrigation as regards the appearance of our country. The country would look better: There would be less expense of road making and keeping ditches in repair.

MR. PRESIDENT: I prefer high headed trees, though, as I keep them to sell, I grow them of various heights. I prefer five to six feet, on an average.

MR. EMERY: A Kansas man trimmed his trees low; he could not cultivate nor could he let the hogs in, for they would climb the trees and eat the apples.

MR. PRESIDENT: The proper distance to plant trees is from twenty to twenty-five feet. But I would set a young orchard fifteen feet apart, and when they grew large would cut out every other tree, leaving the trees thirty feet apart in rows fifteen feet apart. Trim when your knife is sharp and there is no frost in the tree.

MR. ROBBINS: Would Mr. BROTHERS trim young orchards in June?

MR. BROTHERS: I always carry my pruning knife, and trim what needs to be trimmed. I would not trim

when there is frost in the wood, though I have no very definite idea on the subject.

MR. ROBBINS: In Massachusetts they used to trim when the wood was frozen, and I do not think it hurt the tree. I do not like to cut large limbs.

MR. PRESIDENT: I cut off large limbs and do not fear for results. I varnish wounds with shellac. An Englishman told me that in a spreading tree he would cut the limb above an inside bud; on a close-tending tree cut above an outside bud. An apple tree needs only enough cultivation to keep it clean. The orchard does not need to be kept wet. When you buy trees of a nurseryman, you are overkind to them; you mulch them overmuch and drown them out. Mulch lightly and water at a distance of two feet, keeping the ground damp only. We discussed sub-irrigation at Boulder, and decided that it would cost from six hundred to one thousand dollars an acre to sub-irrigate. I don't know if I could make fruit pay on that land. I could not raise wheat and oats. I know only one good cheap way to prevent sun-scald. Plant a currant bush on the south side, about a foot from the tree.

MR. BACON: I can't afford to cultivate an orchard without getting something from the land. I raise squashes. The leaves protect the ground in the latter part of the season, and are a good thing for the ground.

MR. COLE: I think one can irrigate with pipes at less cost than six hundred dollars.

MR. MILLESON: I tried putting in a four-inch wood pipe three hundred feet long. The second year I found something was wrong. When I dug it up it was nearly full of moss. I used Platte water. Iron pipes will fill unless flushed under heavy pressure. I have an iron pipe one thousand three hundred and fifty feet long, but I

flush it with a twelve-foot head. I am afraid sub-irrigation will not be a success.

MR. COLE: Sub-irrigation will yet be a success.

MR. BROTHERS: I don't think we should say in this fast age what can not be done. I want to ask the young man to experiment.

After the Society had adopted the following report of the memorial committee, it adjourned, to hold its next meeting at Boulder:

WHEREAS, By the death of PROF. JAMES CASSIDY, of the State Agricultural College of Colorado, which occurred on the twenty-first day of November, 1889, the Northern Colorado Horticultural Society loses one of its most useful members, and the State of Colorado an able educator; therefore, be it

Resolved, That this Society express its high appreciation of him as a man of lofty character, and a horticulturalist of great ability and practical usefulness.

Resolved, That we look upon his death as a misfortune to his family, to our society, to the Agricultural College, and to the State.

Resolved, That these resolutions be spread upon the records of this Society, and that a copy be engrossed and presented to MRS. CASSIDY, and, also, that a copy be furnished the State Agricultural College.

[Signed],

E. MILLESON,
J. W. GOSS,
D. W. WORKING.

REPORT

OF THE

Pueblo District Horticultural Association.

APRIL 5, 1890.

DR. ALEX. SHAW, *Secretary*

State Horticultural and Forestry Association:

DEAR SIR: In response to your request for a report from our association, the Pueblo District Horticultural Association, I have but little to report.

We are now working in our third year, and the Association is slowly but permanently growing. Through its influence Pueblo County was enabled to carry off first premium (\$100) for county agricultural exhibit at the last State Fair. We now have about thirty-five active members.

At our January meeting, 1890, the following officers were elected for the year:

President—L. M. Sperry.

Vice-President—E. F. Bartholomew.

Treasurer—Mrs. J. W. Booth.

Secretary—Geo. B. Bowman.

The new year starts out very encouragingly, and there seems to be considerable work before us.

I send you a list of programmes of our monthly meetings to let you see the subjects that are discussed.

We hope to see you at our next State Fair.

Yours, very truly,

GEO. B. BOWMAN.

PUEBLO DISTRICT HORTICULTURAL ASSOCIATION.

Report of Committee on Programme, P. D. H. A.

FIRST MEETING, WEDNESDAY, NOV. 20, 1889.

1. Our Girls on the Farm and How to Keep Them
There Mrs. L. D. Booth
2. Trimming Apple Trees the Proper Season . . . Mr. Bartholomew
3. The Hired Man in the Family Mrs. H. Baker
4. A Silo Mode of Making and Filling with Ensilage. . . W. Wing
5. The Best Apples for This Section of Country, Summer, Fall and Winter President Jacob Haver

SECOND MEETING, WEDNESDAY, DECEMBER 18, 1889.

1. What are the Benefits Arising to Women by Being
Members of the Horticultural Society? . Mrs. L. M. Sperry
2. Ways and Means of Interesting Young People in
Natural History with a View to Its Practical Application Mrs. A. E. Orton
3. Chickens in the Garden Harry Baker
4. How May Non-Members of the Horticultural Society
be Made to Feel and Take an Active Interest in
the Work? Mrs. Bartholomew
5. What Advantages are to be Obtained by a Membership
to an Horticultural Society? L. M. Sperry
6. The Hired Man on the Farm H. Morey

THIRD MEETING, WEDNESDAY, JANUARY 15, 1890.

1. Evenings at Home with Reference to General Information Mrs. A. J. Bain
2. Plums and Their Culture. W. J. Booth
3. True Success in Horticulture Mrs. Geo. B. Bowman
4. Should Strawberry Vines be Mulched in Winter? . . . Mr. Weed
5. Farmers' Vacation T. G. McCarthy
6. Which Are the Most Successful for This Country
—Northern or Southern Grown Seeds? And
Why? A. R. Pierce
7. How to Create an Active Interest in the Pueblo District
Horticultural Association Wm. Moses
8. Onions—Variety, Culture, Care and Marketing I. N. Sater

A. R. PIERCE,
Secretary.

JACOB HAVER,
President.

PROGRAMME.

PUEBLO DISTRICT HORTICULTURAL ASSOCIATION

FOR FEBRUARY AND MARCH MEETINGS.

FOR FEBRUARY 19.

| | |
|---|------------------|
| Grape Culture | Mr. Bartholomew |
| Floriculture, Its Aims and Benefits | Mr. G. B. Bowman |
| Help in Farm Household | Mrs. R. E. Sword |
| Canning and Preserving Fruits | Mrs. L. D. Booth |
| The Requisites of a Successful Gardener | Mr. Harry Baker |

FOR MARCH 19.

| | |
|---|------------------|
| California Irrigation | Mr. Brayton |
| Ways and Means of Interesting Young People in Natural History with a View to its Practical Application . | Mrs. A. E. Orton |
| Hired Men on the Farm | Mr. H. Morey |
| | L. M. SPERRY, |

GEO. B. BOWMAN,
Secretary.

President.

PROGRAMME.

PUEBLO DISTRICT HORTICULTURAL ASSOCIATION.

FOR SECOND QUARTER, 1890.

FIRST MEETING APRIL 16.

1. Strawberry Culture Wm. Farmer
2. Woman's Life on the Farm As It Is and As
It Should Be Mrs. N. C. Child
3. How to More Profitably Spend our Winter
Evenings with Reference to Proper Course
of Reading and Mental Improvements . . . Mrs. L. M. Sperry
4. What Advantage has the Farmer over the
Merchant, if any Mr. I. N. Sater
5. How to Successfully Grow Celery and to
Keep it Through Winter Mr. H. Morey

502 PUEBLO DISTRICT HORTICULTURAL ASSOCIATION.

SECOND MEETING MAY 21.

1. With Whom Does the Fault Lie that the
Farmer is the Hardest Worked and Poor-
est Paid Mr. L. M. Sperry
2. Cultivation of Flowers from a Moral Stand-
point Mrs. A. J. Bain
3. Farmers' Vacation and how to Enjoy more of
the Comforts of Life Mr. J. W. Booth
4. How to make Home Attractive Mrs. M. V. Sword

THIRD MEETING JUNE 18.

Strawberry Festival.

Business Meeting.

Music Miss Sword
Select Reading Farm Festivals Mrs. Wm. Smith
Music Mr. P. W. Search

Refreshments, Toasts.

L. M. SPERRY,

President.

GEO. B. BOWMAN,

Secretary.

Fremont County Horticultural Society.

Meets at Court House, in Cañon City, on the first
Saturday of every month.

OFFICERS:

President W. B. FELTON
Vice-President JOHN GRAVESTOCK
Treasurer W. A. HELM
Secretary EUGENE WESTON

COUNTY FRUIT REPORTS.

FREMONT COUNTY—BY W. B. FELTON, Cañon City.

1888.

Orchards—Almost all kinds of apple trees bore a full crop. A cold spell—nearly zero weather—the latter part of March killed some of the fruit buds on Wealthy, Jonathan, Duchess of Oldenburg, and other early starting varieties, so that trees of those varieties bore only fairly well, but most varieties were full. There were but few Transcendent Crabs, while later blooming varieties, like Hyslop and Quaker Beauty, were full.

The pear crop was badly damaged by said cold spell in March. The trees were full of fruit buds, coming forward rapidly when they were killed. Dormant buds came out later, making a fair crop of some varieties.

There were a few cherries and tame plums, but not what would be called a crop of either. Native plums bore bounteously.

Peaches were like snakes in Ireland—there were none.

Vineyards—Grapes were almost a total failure, for the first time since grapes have been raised in this county. The fall of 1887 up to the latter part of November was unusually warm; then came a very sudden and extreme change to eight degrees below zero, which killed the fruit buds. Consequently there were no grapes except upon such few vines as had been covered before that freeze.

Small Fruits—The yield of strawberries was lighter than usual, but as that was the universal condition all over the country, the price was high and the returns satisfactory. No kind of small fruit yielded more than half a crop, but there was no complete failure of any.

1889.

Orchards—All varieties of apples bore full crops.

Nearly every variety of pear tree was full.

Tame and native plum trees bore phenomenally heavy crops.

Every cherry, peach and quince tree was full.

Vineyards—Grape vines, of all varieties, bore good crops.

Small Fruits—The strawberry crop was large; raspberries and blackberries bore full crops; currants bore unusually well, and gooseberries, of all kinds, bore a full crop. In fact, 1889, was a remarkable fruit year, as everything old enough bore a good crop; even apricots and nectarines, and every peach tree in the county, old enough to bear, was full.

PRICES.

Apples sold readily at \$3.25 per barrel in car load lots right from the orchard, in the fall, and smaller lots at \$3.50 and \$3.75 per barrel. Pears sold for six cents per pound; peaches, ten cents; plums from \$1.50 to \$2.50 per bushel; cherries were sold mostly in quart boxes, at from ten to fifteen cents per box; grapes averaged about six cents per pound; strawberries, in crates of twenty-four quart boxes, ranged at from \$6.00 to \$3.00 per crate.

The Codlin Moth is the greatest pest we have to contend with, although the Grape-Leaf Hopper (*Thripso*) put in an active appearance in some vineyards for the first time in 1889. Curculio, borers, etc., have so far done but little damage here.

Fruit growing is by far the most profitable product of the soil in this county.

VARIETIES.

Over one hundred and fifty varieties of apples, thirty varieties of pears, many varieties of cherries, plums, grapes, and all kinds of small fruits, are successfully grown. Where such a large number of varieties do so well it seems to be principally a matter of individual choice as to which shall be planted. The chief rule to be observed is to avoid extra early blooming varieties, as the warm weather in winter causes these varieties to start so early that sometimes the fruit buds get nipped, when later blooming varieties go through all right.

Secretary's Round-Up.

WHOLE ROOT VS. PIECE ROOT TREES.

BY CLARENCE M. STARK, LITTLETON, (near Denver), COLORADO.

No consistent argument can be found to show that piece root grafted trees are equal to trees grafted "in the natural crown" (as Downing expresses it), except upon the hypothesis that it is a desirable thing to have orchard trees mainly or wholly "on their own roots." If the true method of propagation be to grow trees from cuttings, or, what is practically the same, to use just as little of the seedling root as will give the cion a start, depending upon the cion to throw out the main system of roots for the support of the future orchard tree, whatever materially interferes with the production of such cutting trees is contrary to the laws of nature; and as a small piece of root cannot support a vigorous growth, thereby necessarily forcing the cion, if it survives, to put out roots of its own, it is contended by the advocates of piece root grafting that the smaller the piece of root the better, because then the more nearly will the tree be on its "own roots." For they take it for granted that the one thing needful is to get trees "on their own roots," assuming there can be no question that such trees are hardier, more productive, longer lived, and in every way superior to trees which have the natural collar of the seedling left intact together with its full natural system of roots radiating downward in all directions. But the facts do not bear out the assumption, and besides the misleading inference is often conveyed

Note by Secretary—Under this department will be found such instructive information as I may have found worthy of preserving in book form germain to horticultural pursuits.

that whole root trees are *not* on their own roots; for the fashion is to ignore the fact that properly grown whole root trees possess an ample supply of fibrous horizontal own roots for surface feeders, and are just as truly "on their own roots" as piece root trees, though unlike the latter their own roots are not their chief stay and support.

The whole argument, if it is consistent with itself, admits that the effect of the piece root "manufacture" of apple trees is to produce, in direct violation of nature's laws, cheap nursery trees without a natural crown, and without the natural system of roots which a seedling only, and a cutting never can give to the future orchard tree; for if this were not the case it is plain that the method could not enable the "wholesale manufacturer" to sell his abnormal piece root grafts at a price which tempts anybody who can plant turnips for greens in the spring to buy and, forsooth, become a "nurseyman." What matters it though the sole stock in trade of this "home" nursery be the resultant, ignorantly cared for, oftener still, not cared for at all, "first class" apple trees (such nurserymen never grow any second class); any items short, "as occasionally happens in all nurseries," will be ordered from a wholesaler, while the buyer felicitates himself upon having patronized home enterprises and possessing "acclimated" trees. We would not disparage small nurseries—far from it, but we feel that the culture and propagation of fruit trees and plants, particularly the apple, is a matter of greatest national importance, closely connected with the welfare and happiness of countless thousands. A practical propagator or any intelligent young man eager to learn, who establishes even the smallest nursery in any community, and carefully attends to his own grafting, budding, propagating and other

professional work, selling what he knows to be good, well grown stock is a public benefactor.

But who can number the decrepid young orchards scattered over the entire country largely attributable to a vicious system of growing short-lived trees, more like cuttings than nature's plants, by wholesale nurserymen. Perhaps the ideal tree is one wholly on its own roots—a natural sucker from the original tree of the variety. Yet even such trees often lack deep penetrating roots, and are overturned by storms, but they always have a crown formed by nature, the absence of which is a grave defect, still not the most serious fault of piece-root trees. That these sucker trees are unattainable is no reason for not taking the next best trees that "this art which does mend nature" can produce—trees properly budded or grafted on natural seedling stocks.

In making piece-root grafts, "using a long cion and a short piece of root," the main dependence is that the cutting or cion will put out roots of its own. But the fact is overlooked that a tree propagated from a cutting is less hardy than the same variety grown on an ordinary seedling. This has been fully demonstrated. A leading member of the State Horticultural Society of California utters the warning: "I would caution planters against plum trees raised on Myrobolan stocks which have been grown from cuttings. A seedling is much the hardier and more vigorous." And in our nurseries at Louisiana, Mo., notably in the case of the Wild Goose and other plums, we have had two-year-old trees grown from cuttings to winter kill badly, while the same varieties on *Chickasa* and *Americana* seedlings as well as on the less hardy Myrobolan were uninjured.

In the next place, as President T. T. Lyon has said, it is plainly against nature to take a cion which has grown high up in the sunshine and air, place it almost

wholly underground, quite out of its proper element, and then expect that it can so completely change its nature as to make a perfect root system, crown and a top—all from a short cion formed by nature for ærial conditions alone. Yet these are precisely the requirements imposed in piece-root grafting. A one-year-old seedling which, as all nurserymen know, grows naturally with long tap roots, is cut into pieces an inch or two long and a six or seven inch cion spliced to each bit of root. When planted only about one inch of the cion is above ground, and but one out of the half dozen or more grafts made from the seedling will have a natural collar, and even it is too deep underground. Besides, as Peter M. Gideon, superintendent Minnesota Experimental Orchard, says, this collar piece has been cut so short that only fibrous and no tap roots result.

The third count against piece-root grafts is the imperfect and unnatural union of the cion and all pieces of the root except the collar section. This defect is the consequence of the difference in texture of the wood and bark, as well as a lack of analogy between the albumen of stock and cion. The result of this is two imperfect and dissimilar systems of roots; also an abnormal enlargement at the point of union, the root part in an average two-year tree often being one and one-half inches in diameter and the original cion less than an inch thick. This *enlargement* and the difference in *color* above and below the junction, as well as their irregular and often "horny" systems of roots, afford tests by which with very little experience any one may distinguish piece-root trees. It is impossible to detect the point of union in rightly grown two-year collar grafted trees. Such is the difference, even while young, that when whole-root and piece-root trees of the same variety and size are mixed together, there are but few who

could not soon learn to separate them readily. Indeed, E. Moody, one of the oldest and most experienced nurserymen and orchardists of Western New York, declares he can distinguish at a glance the two classes of trees even in bearing orchards.

In the fourth place, and this is their chiefest fault, one fatal in the extreme, and wherein lies their absolute and utter condemnation, the *cion* emits not only a *scant*, but almost invariably a *shallow* system of roots. Hence, unnumbered thousands of these trees fall before storm and drouth, wet and cold. For all who have observed with any degree of care know that cuttings, be they grape, quince, Le Conte pear, or the *cion cuttings* of the piece-root apple grafts, while making abundance of fibrous horizontal roots, rarely, and almost never put forth any strong, deep-reaching, or tap roots. Cuttings are well enough for grapes, currants, and such things as do not require far-reaching brace-roots, but apple trees thus grown will cause sore disappointment. Especially should they be avoided in regions where irrigation is practiced, for in these regions high winds prevail, and when the water has long been turned on only those who have seen it can form any idea how completely the soil is soaked, and how often the winds turn out such trees by the roots. In Colorado we have seen many examples of this, not in old, worn out orchards, but in apparently vigorous, young orchards, just beginning to bear.

Trees grafted on pieces of roots are by no means destitute of all value, but the longer the pieces of root the better the tree. One trouble has been that grafts on bits of roots two inches or less, are far more plentiful than on pieces three, four or five inches long.

But unquestionably much the best trees are those on whole roots, by which is meant such as are grafted or budded on vigorous, first-class stocks, just above the

crown, with the natural collar left undisturbed, using but *one* seedling for *one* tree. In whole root grafting a four-inch cion is used and the long root of the seedling is shortened to five or six inches, the same as when transplanting for budding, besides making the graft convenient to plant, this induces more strong side-roots to put forth, as well as *several* vigorous deep-extending roots instead of the *one* straight tap root that, otherwise, would usually result. Thus the grafts are eight or nine inches long, allowing one inch for the splice, and involve special care and preparation, as well as considerable more work in planting than piece-root grafts, the latter being but five or six inches much oftener than seven or eight inches in length. And as the joint is planted fully three inches below the surface, own roots are sent out from the cion. Budded whole root-trees, if budded low—just above the collar—are equally as good as grafted, if properly planted, so that *all* the seedling stock be under ground; but they are not on their own roots, and for cold regions are less desirable than grafted trees.

We are free to confess that we, too, were opposed to the very idea of whole root-trees until we investigated for ourselves, being led thereto no less by the writings of eminent horticulturists than by observing old orchards still healthy, which were planted from our nurseries long before piece-root grafting was begun there, while much younger orchards of piece-root trees were failing. In a small way at first the propagation of whole-root trees was commenced, both by collar grafting and by budding, using always first-class stocks, for the reason that second and third class seedlings, being weak and dwarfish at one year, are more apt to continue feeble. And in this connection we can not refrain from mentioning, as an illustration of a characteristic type of

unfairness and prejudice, the case of a nurseryman who exhibited what he called first-class budded two-year trees, three or four feet high, and evidently grown on cull stocks, along with well chosen piece-root two-year-olds, to show the superiority of the latter. It may be that the effect was not exactly what he anticipated when we brought forward very finely rooted budded *one-year-olds*, standing full five to seven feet.

We grow piece-root trees (and just here we will say that we have never sought, and do not now seek, free advertising; so the publisher will please charge our account with all "shop talk.") We must grow these cheap trees because of the keen competition in the nursery line as in all others; for there are planters who always want what is lowest in price. But we know that whole-root trees are the better, and plainly so state. Then all who buy piece-root trees do so on their own judgment, not upon our advice or recommendation.

We have already cited the opinions of President T. T. Lyon, E. Moody and P. M. Gideon, while that of the *Rural World's* own Judge S. Miller we all know; therefore it is only necessary to quote a few extracts giving the results of experience of others whose names are to-day among the most eminent in the annals of American horticulture. If there be any such names among the advocates of the piece-root system, a somewhat diligent search has failed to discover them.

Downing wrote years ago, in the great work of his life, "Fruits and Fruit Trees of America": "Large quantities of trees are propagated by using pieces of roots, thus forming from the root of one stock two or more grafts. This practice, although quite common, is of *very doubtful* value, and by prominent horticulturists considered as tending to debilitate and reduce vitality—the seat of vital life in fact resting in the *natural crown*

of the seedling, and *that* once destroyed cannot be renewed. It is therefore apparent that but one healthy, permanent tree can ever be grown from a single seedling stock."

P. Barry, one of the foremost horticulturists now living and the leading American authority, describing the operation of budding in his well-known book, "Barry's Fruit Garden," speaks of high and low budding and the necessity for the latter; after giving the reasons why stocks should be budded as close to the surface of the ground as possible, even removing some of earth, he sums up the whole matter in few words—"low budding makes the best trees." Of the kindred operation of grafting he wrote, less than a month ago: "I would say very good trees are produced on pieces of roots three or four inches in length; but there is no doubt but that the cut next to and including the collar is to be preferred. In either case, the trees get on their own roots."

Prof. J. L. Budd, of the Iowa Agricultural College, says, "At one time I made 1,000 crown-root grafts and another 1,000 of the same varieties on pieces of root. The crown-root grafts, when I came to take them up, had fewer fibers but more strong, far-reaching roots than the others. I planted them all in an orchard, and the result was very much in favor of the crown-root grafts. In later experiments I find it is always true that the crown-root grafts have stronger roots and more of them, and have many far-reaching roots, and in my opinion are the best." In evident allusion to the above, one of our Colorado papers some time ago published the following over Prof. Budd's signature: "Yours received with the slip about crown-grafted apple trees. The plain truth is, that in the light soil of Colorado, trees grafted at the crown will be almost certain to root-kill in winter

as not one seedling in a thousand is as hardy as the Fameuse Apple. A Duchess or any other really hardy tree will be long lived if grafted on a short piece of root with a long cion; such grafts set deep in nursery will root on the hardy wood of the cion in nine cases out of ten, and are better in every respect than budded or crown-grafted trees on whole roots." As this does not quite accord with Prof. Budd's late opinion, recently given to the readers of the *Rural World*, perhaps it may be of interest to reproduce the gist of the same: "I know from experience that the upper part of the seedling root makes a better tree than the second or third section. A Duchess or any other absolutely hardy variety will make a good tree if grown from a cutting, and when grafted on a short piece of root it practically is a cutting, as the piece of root only starts it, and roots are thrown out always from the cion. Fully ninety per cent. of our three-year-old apple, pear, cherry and plum trees are on their own roots if they have been grafted with a long cion on a short root and set deeply. Yet the crown graft is the best, and our nurserymen could afford to make only one tree from one seedling.

Franklin Davis, Ex-Vice-President of the American Pomological Society, thus writes of the evils of piece-root grafting: "The roots from these small pieces can not be so well developed as to properly feed the tree or hold it up; hence they are often uprooted by storms. We must plant the whole stock, leaving the crown as nature formed it; then we have the whole root strong and unimpaired by division to feed and develop the tree. And as the tree is not only held in its place by its roots, but also receives the most of its nourishment through them, it is plain to see why it will grow larger, live longer and bear more." Of whole root trees he says: "The superiority of this mode of propagation has long

been acknowledged by intelligent nurserymen and orchardists, yet nine-tenths of the apple trees sold are grafted on pieces of root. Nurserymen have not grown trees on whole roots for the reason that it costs more to propagate them that way, and it has been difficult to get many planters to pay that additional cost; but we are glad to see the people in some sections awakening to their interests. We know such trees are the best, and in making an improvement so important as planting an orchard there is no economy in purchasing an inferior article."

Whole-root or crown-grafted apple trees are the coming trees for Western orchards, a fact we have foreseen for some years. We began their propagation, and have since grown many hundreds of thousands, because we were then satisfied, as we now know, that they are the best. And while we note with pleasure the many recent endorsements by high authorities, horticultural literature has long indicated the now-conceded fact that whole-root apple trees are the trees to plant for permanent orchards. Perhaps no stronger or more authoritative Western endorsement has been written than the following, which is condensed from a valuable paper entitled "How to Keep our Orchards Healthy," read before the Missouri State Horticultural Society so long ago as 1884, by N. F. Murray, the Vice-President of the Society, and who was recently honored by a unanimous re-election. Mr. Murray has long been known as one of the largest and most successful commercial orchardists in Northwest Missouri, and a horticulturist of much experience and wide observation. He says:

"This is a very important question, and one not only affecting the interests of the orchardist, but also the commercial interests of our whole country, as well as the health and happiness of the fruit-hungry millions

who wait for the rich, luscious and life-giving fruits of our orchards.

"We must seek to find out as far as possible, the causes of the unhealthy condition and premature decay of our Western orchards before we attempt to prescribe remedies. That our orchards are in a deplorable condition no one will deny. We look up and down the bluff lands along our rivers, and out over our broad, rich prairies for healthy orchards, but look in vain. In place of finding the rich, bright, green and glossy leaves, the sign of health and vigor, we see a scant and sickly foliage in which the keen eye of the experienced horticulturist will read starvation, premature decay and death.

"It might be well for us here to inquire how long we may expect our orchards to last—find out, if we can, how long each species and variety of our standard fruits is likely to live under favorable conditions and fair treatment, in order that we may know what to expect. We will first speak of the apple, the standard and king of all fruits. Mr. Knight, of England, famous in horticulture, has placed the duration of the apple tree when worked and grown on a healthy seedling stock, at two hundred years; and speaks of trees over one thousand years old, and still in healthy, fruiting condition.

"S. W. Cole, of Massachusetts, in his book published in 1850, tells of apple trees twelve feet in circumference; and claims that the apple tree, in a wild state, with moderate, regular growth, would live one hundred years or more, and states that he had fruit from a tree in Plymouth two hundred years old. Mr. Cole also says that under high culture, they often fail at one-half that age. I have myself seen trees of the Roxbury Russet that were planted near Marietta, Ohio, by the celebrated Israel Putnam in 1796, that were seventy years old, still healthy and bearing well. The original Grimes' Golden Pippin tree, in Brook county, West Virginia, was, some years ago, eighty years of age and still in good health.

"From my own experience and observation in the Ohio River valley, I feel safe in placing the average life of the apple orchards there at sixty years. As we come

Westward we find it much shorter. Some writer claims the average age in Illinois to be twenty years, and in Missouri twenty-five years. From an experience of sixteen years [Mr. Murray wrote six years ago] in Northwest Missouri, I would not feel safe in placing the average above thirty-five years.

"In tracing the cause, we fail to find it in any one of the numerous theories advanced, nor do we find it in the geographical position of the country, nor in the climate, nor yet in the soil. * * *

"I believe one great cause underlying this question is that in our mad rush and greed to multiply trees to satisfy the demand for cheap nursery trees, we departed from one of the great and grand laws of nature that should never have been violated, when, in place of making one root for each graft, from each seedling, grafting at the collar, we went to cutting them into small roots, often making from two to five or even a dozen roots from each stock.

"This practice may suit the nurseryman who feels that he must grow cheap trees, so he can compete with others who follow the same practice. The public have no right to complain so long as they are unwilling to pay more than ten or fifteen cents for their trees, but such stock will never make the large, healthy, lasting trees that once flourished in our country, and that were started before this pernicious style was introduced.

"That this is one of the chief causes of the short duration of our apple orchards we learn from our own experience and from the fact that it has been almost universally practiced, East and West, for nearly fifty years; and that we hear our own lamentations re-echoed by our eastern brethern, victims of the same mistake.

* * * * *

"Now, I think, in order to have our orchards healthy, we must, as far as may be, go back to first principles, and pay more attention to the laws of nature. We must renounce both the forced overgrowth and the starvation systems. We must start with seeds carefully selected from healthy trees—grow them one year, then graft just above the collar." * * * *

Several Western nurserymen recently have been denouncing whole-root trees in the horticultural press, many, perhaps all, of whom truly believe that piece-roots are better—all the more reason why they should heed the numerous warnings given by the highest authorities. Let us, then, do the best we know and all earnestly strive to advance our beloved Horticulture—man's first occupation; do all the good we can, rejoice at one another's success, adopt better methods, and join with all brother nurserymen to grow the best trees we can for the orchards of the future. For, as Prof. Budd well says, "the crown-graft is the best, and our nurserymen could afford to make only one tree from one seedling." Answering for ourselves we beg to say that beginning the propagation of whole-root apple trees with a plant of 17,000, setting the same season 240,000 piece-root grafts; the number planted last year had increased to nearly one and a half millions, 600,000 being on whole-roots; the plant this year is nearly two million, over half being on whole roots.

And now we must ask the reader's indulgence. A few nurserymen, who evidently grow neither whole-root trees nor trees on Mariana stocks, but who feel aggrieved over the persistent demand for a better tree than they grow, have been filling the papers with free advertising of their own stock, and at the same time, in the absence of any other objection to urge against whole-root trees, trying to give the impression that they are sold at exorbitant prices. One grows virtuously indignant because "the man who pays four prices for an apple tree on whole roots is as effectually robbed as if he had his pocket picked," while another disinterested and unselfish nurseryman tells the dear people that plums on Mariana roots are not "worth four times as much as those worked on Myrobolan stocks." Against our usual custom, we will

here notice these oft-repeated assertions, lest by their very repetition they may come to be accepted as true.

We have already shown the fallacy of the arguments for piece-root trees. As to "four prices," while we neither know whether others charge "four prices," nor often publish our own, thereby giving competitors a chance to figure just under us, we will say that our retail prices for apple trees, of all leading varieties have long been 15 cents each for piece-root and 25 cents each for whole-root trees, and these prices include all costs of packing, risks of transportation, together with delivery in good order to purchasers in any State or Territory, freight and all charges paid. If these be "four prices" well and good. We also sell plum, prune and apricot trees on Mariana roots at the same price as on ordinary plum stocks.

One of these nurserymen, advocating piece-root apple trees and plums on peach roots, after vigorously denouncing the "four prices," further says: "Plums grafted in 1870 on Myrobolan roots have sprouted and made a worthless thicket—poor trees and very little fruit," which, by the way, is the usual experience with the Myrobolan stock; and worse still, it is only half-hardy and a far more prolific breeding ground for Borers than even the peach. He also triumphantly asks: "Where are your plum trees on Mariana roots fifteen or twenty years old that will afford us any tangible proof that they are better than on peach root or a hundred other native varieties of plums?" By his question he shows either that he is behind the times on varieties—the Mariana having been introduced only some seven years ago—or then it is a palpable attempt to overreach. He also wants authorities cited in support of whole-root trees and Mariana stocks (we trust he now has them, authorities undisputed and irresistibly conclusive), yet he him-

self advances as arguments his mere assertions only—the very thing he accuses others of. Consistency personified! Another argument is against nurserymen who advertise for salesmen, “experience unnecessary.” He, like some others, apparently expects nursery salesmen to have a college education as well as a diploma from himself or other like scientific authority. It seems profoundly incomprehensible to him that some nurserymen may have means to instruct their salesmen, educating them as it were, so that they can act about as intelligently as even this authority himself.

In the same journal the other nurseryman like unto him writes: “While the Mariana stock promises to be very valuable, it lacks the test of years and adaptability; it is a cheaper stock than Myrobolan and buds take to it more readily, hence trees can be grown cheaper on Mariana than on Myrobolan.” It is very plain that the one has plum trees on peach roots to sell, the other trees on Myrobolan, and that neither has trees on Mariana roots—strange, too, when it is a “cheaper” stock than the notoriously half-hardy, sprouting, borer-ridden Myrobolan. Mariana stocks with this writer must be cheap indeed if cheaper than Myrobolan, for the latter are bought in France at a cost of \$3 per thousand or less; for our part we should be glad to get Mariana stock, even if grown from cuttings, at three times the price—for, besides furnishing everything, we pay nearly double, merely as a bonus to encourage our propagators to do their utmost to grow every Mariana possible. And stranger, still, that in this age of wild competition when nurserymen, in order to produce trees at the lowest possible cost, use the cheapest plum stocks obtainable—even the peach and next the Myrobolan—this grower should not avail himself of the “cheap Mariana.” But strange as all this may be, surely 'tis passing strange that the Mariana should

"lack adaptability," yet "buds take to it more readily" than to the Myrobolan! However, this paradox, like adversity, has its uses—for it clearly exposes the true animus of the writer.

As for peach stocks, J. J. Thomas, for more than a quarter of a century the able editor of the *Country Gentleman*, says in his chief work, "The American Fruit Culturist," that "The peach has been occasionally employed as a stock for the plum. A very few varieties take readily and grow freely; but the great uncertainty which attends its use, and the failure with most varieties indicate the propriety of the rejection of the peach for this purpose."

Well, notwithstanding all that interested nurserymen may say to the contrary, thinkingmen will investigate for themselves. The fact is that the Mariana promises to be the most perfect stock known for the plum, prune and apricot. We feel a pardonable pride in its success, inasmuch as we first discovered its value as a stock and first used it, having budded in 1886 over fifty thousand. That it has been a success may be gathered from the fact that, with the aid of other and more perfect methods of propagation than from cuttings, our plantings have steadily increased until this season it exceeds one million. Of course there are no trees on Mariana "fifteen or twenty years old," but it is evident that it cannot be worth less than "any one of a hundred other native plums" for it has all their advantages, besides being better in that it is perfectly free from their one great fault of suckering; and is also very hardy, a vigorous grower, and more nearly exempt from borers and diseases than any other plum stock in use. Plum, prune and apricot trees on Mariana, shipped to California and elsewhere, have thus far given perfect satisfaction and resulted in a heavy demand for more. In a paper read

before our State Horticultural Society in 1886, we ventured the prophecy that the time is coming when the importation and use of foreign plum stocks not only will have ceased, but all other plum stocks and the peach stock for the plum, prune and apricot will be superseded by the Mariana! To-day, but with added force we repeat this prediction.

How easy a thing it is to condemn the use of advanced ideas and methods by others, even without any experience of one's own, and especially so if the "shoe pinches." But before trying to discredit the Mariana stock, it might have been safer to learn more definitely who favor and use it; since we began to herald the merits of this stock, many others have adopted it. Would these, our horticultural teachers, "full of wise saws and modern instances" have cared to go before their readers decrying the merits both of whole-root trees and of Mariana stocks if they had kept sufficiently abreast of horticultural progress to acquire, among other possibly useful information, a knowledge of the suggestive fact that this stock has been adopted and is now used by an authority at least as high as they themselves—P. J. Berckmans, President of the American Pomological Society. Mr. Berckmans says, "the tree is of a remarkable hardy and thrifty habit, and so far seems to be less liable to die back than the Wild Goose," and in a letter he writes us that he has never used but one other plum stock besides the Mariana. Another prominent nurseryman, among the several who have begun to use Mariana stocks, says: "The tree possesses great value as a stock upon which to bud other varieties, it being remarkably hardy and of a very thrifty, stocky growth. All of the plums that I am offering this season are grown on Mariana plum stocks." Still another says, "the Mariana as a stock is No. 1, don't sucker, is a

strong grower and imparts its vigor to what is worked on it." Not the least significant point here made is the great vigor of trees on Mariana; especially so when it is remembered that trees on the Myrobolan are always dwarfed. B. D. Herman, of Central Iowa, writes the *Prairie Farmer*: "The Mariana stock is better than the Myrobolan, and being a seedling of the native Chickasaw it is better adapted to this climate; it does not sucker from the roots." W. Jennings, in *Southern Horticultural Journal*, says: "A row of Kelsey plums on peach roots were rendered worthless by root-knot, while other rows near by on Mariana stocks were perfectly free. This indicates that where root-knot prevails the Mariana is invaluable. I am quite satisfied that it is an excellent stock for the P. Simonii and all the Japan plums, but for other stone fruits must have time for further observation."

• It is in no spirit of boasting that we have given a few items showing the progress made with improved methods, but simply to prove that "the world does move," and horticultural science lags no whit behind, as well as to show to our friends and customers how fully their generous aid and encouragement has helped us to perfect our system of culture and propagation, and to extend the business, in some measure at least, to the grand proportions resolved upon by the writer and his associates, when, with the high hopes of youth, they took the helm. And perchance also it may serve to indicate to some that the energy and time expended in opposing the use of perfected processes by others could perhaps more profitably be devoted to improving their own methods. Take it for granted such opposition had ruined us, what would it have profited the opposers? Unjust abuse generally does more good than harm. "Running down" another's business will not build up

one's own. Besides, this is a large country and there's room for us all. No one person or firm can expect to do all the business.

IRRIGATION.

BY HON. J. E. MAXWELL, STATE ENGINEER.

Mr. Chairman and Gentlemen of the Convention:

Being neither a theoretical, scientific nor practical farmer, it may seem presumption on my part to appear at all before an intelligent audience like this to entertain you on the subject of agriculture, and I can assure you that it is not of my own free will and accord that I appear here to-day, but rather under protest, and I will assure you further that if I were to tell you what I do not know about farming it would take all day. What I do know will require but a few moments. I take it for granted that I have been selected for this purpose, not on account of my ability to address you on farming proper, but because by virtue of my official position I may be in the possession of some data and figures that would be of interest to this convention in solving the problem that is before it. I will confine myself almost exclusively to figures in the remarks that I shall make with regard to agriculture or farming in Colorado. We have within the borders of Colorado a large extensive country, embracing about sixty-six million of acres. This is divided by the Rocky Mountains, giving about twenty-five million acres on the Western slope, and about forty million on the Eastern slope; giving about sixteen million acres of mountain territory on the Western slope, as against about nine million of valley and mesa land; giving ten million of mountain country on the Eastern slope, as against thirty million acres of valley and mesa lands.

You will see, gentlemen, readily that the drainage area of the mountains on the Eastern slope is out of all proportion to the valley or arable lands which we have west of the Rocky Mountains. The great question that we have to consider in agriculture in Colorado, in farming, is the question of irrigation. This thirty million of acres of land east of the continental divide is, the principal portion of it, arable land, possessing wonderful fertility, which, under the quickening influence of water, could be made the garden spot of the world, and made to sustain a dense population, and would make of Colorado an empire and the commercial center of the United States, as it is now the geographical center. [Applause.] But, gentlemen, where are we going to get the water? Aye, there is the rub. I am well aware that there is a difference upon this subject.

THE EASTERN SLOPE.

While we have thirty million of acres of arable land on the Eastern slope—and I will say here I will confine myself to the Eastern slope principally, because it is with regard to this section of the country that we have the most statistics—we have five thousand miles of ditches, covering two million five hundred thousand acres of land. There are also one million acres of land under cultivation, and, as I said before, there is a difference of opinion as to the question of the water supply. A great many conscientious farmers seem to think, and perhaps they have good reason for it, that already the water supply, especially with reference to the Eastern slope, is already exhausted. And, gentlemen, when I have seen a dozen farmers come into my office with stuffed clubs and double-barrelled shotguns demanding water [laughter] I have been forced to think myself that perhaps the supply was exhausted. But when I come to look at the figures and the facts that are

presented to us to-day, and the experience that we have had in this respect, I am led to a different conclusion. [Applause.] It is estimated that in the ten million of acres of drainage area in the mountains there is a natural precipitation of about thirty-four inches of water covering the entire ten million of acres. Of this natural precipitation of thirty-four inches, it is estimated and calculated from observation made at the base of the mountains that about forty per cent. of it reaches the valley, the rest disappearing from evaporation and seepage. This forty per cent. would be between thirteen and fourteen inches in depth of water, covering ten million of acres of area, and, as has been stated, if this thirteen inches could all be saved, covering ten million of acres of land, supplemented by the local rain-fall, it would be ample to cover ten million of acres of our arable land, and would place it in cultivation. [Applause.] But it has been stated that owing to the evaporation and seepage only a part of this, perhaps a small proportion of it, can be utilized. Now, the question comes before us: How much of this evaporates? How much of it goes into the ground by seepage? On this question we have some interesting data which I will lay before you. As you are all aware we have ditches diverting the water from our natural streams and carrying it over the country east of the Rocky Mountains and covering about two million five hundred thousand acres of arable land, and from our experience we know that when those ditches were first taken out the seepage was immense. In some of our large canals which extend out on the plains fifty or sixty miles, thirty or forty feet in width and not less than six deep, it was impossible to get water to the eastern limits of the ditch on account of seepage, the water going through the bottom of the ditch like a sieve. In course of time the ditch became puddled so that the seepage is not so great

to-day as it formerly was. As the water was turned upon the land we all know that it takes a small proportion of the amount turned on the land to sustain plant life. The greater portion of the water turned on the land goes into the ground and disappears.

SEEPAGE WATER.

For a series of years this water has been a total loss. But to-day what do we see? This water has been sinking into the ground along the foot-hills for twenty miles in width from the High Line ditch on the South to the ditches North of the Cache a la Poudre on the North. To-day this section of country is a vast underground reservoir holding the water that has been carried out on the land, not only last year or the year before that, but for years past, until now we are beginning to get the benefit of that seepage. It is beginning to come back into our streams, and by actual measurement made this summer by the General Government and the State Government it has been ascertained that the amount of water that comes out of the Platte cañon has been used over three and one-half times as it comes down the Platte. It is taken out by the upper ditches, turned over the land, works its way back to the main channels; it is again placed on the land, again passing down into the main channel and again worked out on the land. So that by actual measurement we have used this water, not the seepage water, but the actual water coming out of the cañons, nearly three and a half times over again. We are beginning to receive a benefit from seepage. We are beginning to get back not only the seepage of these thirteen inches which is required to cover the ten million acres of land, but we are using over and over again the original water. There is another question that confronts us, and that is the question of reservoirs. We have along the base of the mountains

hundreds of reservoirs that have been established as a matter of necessity. The establishment of these reservoirs is for the purpose of storing the surplus water from our natural streams, and this has become a necessity from the fact that the water comes down from the range much sooner now than it did years ago, owing to the large destruction of the natural timber of the mountain sides. These reservoirs have a capacity at present to irrigate one hundred and fifty thousand acres of land, and I venture the assertion, gentlemen, that the time will come when the system of reservoirs that will be established along the base of the mountains will irrigate fully and entirely the one million acres of land now under cultivation, leaving the water that runs in the main channels free to pass down to the East to irrigate lands further East until it extends to the Eastern limits of the State. [Loud applause.] As to evaporation, which takes place of the thirteen inches of water necessary to irrigate our ten millions of acres along the base of the mountains, this evaporation is again coming back to us in the shape of the rain-belt on the Eastern limits of the State, and in the shape of storm clouds which burst upon us, causing great damage and destruction. We are compelled to protect ourselves from these storm clouds, and in protecting ourselves we are able to store these waters and turn them to use. Reservoirs are being made on Cherry creek, Sand creek, Box Elder and other places, and already six thousand acres of land have been placed under cultivation by these reservoirs taken exclusively from the storm waters.

MORE FARMERS WANTED.

This is a very important feature in the matter of Colorado irrigation. I do not wish to occupy your time too long, so I will go to the immediate question under consideration. As I stated before, we have about one

million acres of land under cultivation at the present time. Assuming that every farmer has, upon an average, at least one hundred and sixty acres of land (and I think this is a very low estimate, because I know, and I presume the most of you do, that many have three hundred and twenty acres and as high as two thousand acres each), I think is a fair estimate to say that every farmer has at least one hundred and sixty acres or two hundred acres each, giving us about five thousand farmers in Colorado to cultivate the one million acres of land. What I claim is, that we want seven thousand more farmers to-day to help cultivate this one million acres of land. [Applause.] We want seven thousand more farmers to buy a portion of this one million acres of land, leaving each farmer only eighty acres of land and thereby relieving him of the incubus that now rests upon him in the shape of indebtedness, and thereby enabling him to start independently of debt and cultivate eighty or a hundred acres of land, which he could do successfully within himself. [Applause.] The farmers here in Colorado, as I suppose they do everywhere, make great complaints of their trials, troubles and tribulations, and they lay it to all sorts of causes. They say it is the tariff, or the want of a tariff, or railroads, or a glut in the market. They assign it to almost every reason on the face of the earth, but I think there is a reason which they have not considered, and that is the question of labor upon the farm. We all know that if a merchant expects to be successful he is required to have skilled labor within his store. If a mill man or a manufacturer, he has to have skilled labor to do the work; and it is the same in every business and avenue of life. But with the farmer it is expected that he will take up with the rag-tag and bob-tail of the earth. He is expected to pick up the tramp who counts the ties on the railroad and comes to our back-

doors and asks for pie [laughter] because he can get no other at the time when he needs them most, in the irrigating and planting and harvest seasons of the year, when there is great demand for farm laborers, and the farmer can get only such as he can pick up. This class of labor, as a general rule, is incompetent, but not only incompetent, but dishonest. Incompetent in this, they know nothing about the use of farming machinery or farm horses or irrigation. They place three times the quantity of water on the land necessary to irrigate it [Applause], thereby destroying a great portion of the farm crop and damaging other people by depriving them of the water. [Applause.] They have but one ambition in life, apparently, and that is to get enough grub inside them to keep their front epidermis from flopping against their backbone. [Laughter.] This is the kind of labor the farmer at present has to use, and by cutting down the number of his acres to what he can cultivate himself he can dispense with this kind of labor and get the labor he ought to have in a limited way. We ought to have seven thousand more farmers to cultivate the land already in cultivation, whereby three or four farmers can be made independent where one to-day is growing poor.

ALFALFA IS KING.

We have the most fertile soil on the face of the earth. It has been stated at different times that cotton was king, or coal was king, or iron was king; but we have a plant here. Alfalfa is king in Colorado—the king of the hayseeds, at least. From this plant we are able to get three or four times the amount of provender they can get anywhere in the East, thereby enabling the farmer to get three times the result from one acre. We can raise three times the amount of wheat that can be raised on the barren soils of the Eastern States, thereby

only requiring one-third of the land to secure the same result. And this may be said of almost every product of the soil. The farmer can then do better here on eighty acres of land than on eighty acres of land in the East, can get three times as much from the soil—and eighty acres are sufficient for all purposes when it is properly cultivated. [Applause.] We do not want to be confined to Colorado in our markets. We have the markets of the world on many products. On hay seed, on alfalfa seed, on our beef, and we are capable of producing millions upon millions of pounds of beef from the alfalfa grass of Colorado. We have the market of Colorado. We have the market of the world on our flour, on our potatoes, and will soon have the market of the world on the fruit grown in Colorado. [Loud applause.] We have some of the richest fruit lands that can be found anywhere in the United States, and it would do a man's eyes good to go to Cañon City and Grand Junction and other places and see the fruit orchards there and see the magnificent results forced from the ground in fruit growing. There are lands at Cañon City and Grand Junction more valuable to-day than the lands in the door-yard of Leadville, no matter how valuable they may be. They can be exhausted, but the lands of Cañon City and all over the State where we have orchards can never be exhausted. They are worth to-day from \$500 to \$1,000 an acre and will increase in value with the years. We not only want seven thousand farmers in addition to the number here at present for the cultivation of the one million acres of land now under cultivation, but we want fifteen thousand more farmers for the cultivation of the one million five hundred thousand now under ditch, but not under cultivation. [Applause.] We want twenty thousand farmers here to-day. I know this question is a serious one, and the question will be asked, Where is the water to come from? Where

there is a will there is a way. Necessity is the mother of invention, and I will assure you that if the farmers will come, and this land is placed under cultivation, the water will be found to cultivate it in time. I believe the time is fast coming when every acre along the base of the mountains will be successfully cultivated by means of the water from the range and the storage reservoirs on the plains catching the storm waters. From those sources I believe ten million acres of land will be placed successfully under cultivation in Colorado, and the irrigation-belt will finally meet the rain-belt and the garden from here to the Eastern State line will be a garden and a paradise. [Applause.]

AN AGRICULTURAL EMPIRE.

We are going to want one hundred thousand farmers here, giving to each man one hundred acres, to cultivate these ten million of acres. We want that section dotted with houses and farms. We are going to build up a vast empire. This rich arable land east of here was never placed there for nothing. It was placed there for cultivation, and in the course of time it will be cultivated. As to the main question before us to-day, the question of bringing before the people of the world our resources in order that we may develop as a State. So far our mining industries have been advertised and made known to the world, as we all know, and the people of the world are pretty well posted on that already; some of them too well posted. [Laughter.] But on the question of agriculture, and the possibility of our farm lands here, the people of the East are lamentably ignorant, and this question has never been brought before the attention of the world until it was done a few months ago by our State Bureau of Immigration. The attention of the world was called more to our agriculture at that time and the wonderful resources we had in the land more

than all else beside, and we want to supplement it in every way in our power. We want to call the attention of the world to the possibilities of Colorado in agriculture. Agriculture is the basis of our success. When it comes to building up a grand empire it must be founded on agriculture. [Applause.] I believe if the people of the East know what our resources are and the fertility of our soil and the amount of arable land we have now lying open, they will come here as quickly as they are correctly posted on the subject by hundreds and thousands, and we can finally have a dense population where now it is a desert waste. Here is a vast industry which should be well considered and brought to the attention of the world, so that extending from the northern limits to the southern limits we may have a vast agricultural population. The Grand River, the Gunnison River, the Bear River, are all underlaid with coal waiting for railroads to come in and for development. There is there also a large and extensive agricultural country with extensive grazing lands, and the possibilities of that entire section are immense, and will draw there a dense population some time. [Applause.] Gentlemen, I thank you for the attention you have given me.

The speaker here resumed his seat, followed by considerable applause.

FORESTRY.

BY D. S. GRIMES.

In solving the different problems of life, how to be the most useful to friends, society, country and individual interests, guided by our circumstances and opportunities, there are no planes of operation more patriotic, natural and human than those that contribute to the general good of the country and add attraction, comfort and health to home and family.

In this connection we claim no work of the hand or mind renders a greater return of profit and pleasure than tree culture. It is a work where all classes of humanity stand on an equal footing.

Intelligent care is the capital required to successfully grow trees. Money can soon build a city house, but money can not build a tree; it must grow, and it will grow no faster for the capitalist than for the day laborer.

Notwithstanding the great need of preserving our natural forests, of planting and growing trees where none grew before, the increased value their annual growth gives to real estate, the protection they afford in our summer's sunshine and winter's storms, but little value or thought is placed upon this important subject. This want of appreciation and lack of proper qualification and education is to be regretted.

Although we note progress in tree planting in Colorado, we fall far short of keeping abreast of other progressive permanent enterprises carried on all over the State.

In the hands of our State Legislature, backed by the power of the public press, lie means and methods to promote, foster and encourage forestry in a manner that

would add millions to the value of our taxable property, protect our native forests and encourage the plainsmen to plant trees.

Experimental forestry stations located in different parts of the State is a work loudly called for. Minnesota has sixteen such stations; Kansas, Nebraska and other Western States have their experimental stations, supported by their respective State Legislatures.

These arboretums, or experimental stations, should embrace all varieties of trees and shrubs indigenous to the State with all others possible to be grown here. They should be arranged and classified with both botanical and common names. Here their adaptation, vigor of growth and behavior under intelligent cultivation could be determined.

These experimental stations should be placed under the direct control of the State Commissioner of Forestry who should appoint Superintendents well qualified in the duties assigned them.

We believe where parks are or may be established those towns and cities would cheerfully contribute a suitable portion of their park lands for this purpose. The citizens also would contribute valuable aid for their support.

WHEN ARE OUR FRUITS RIPE?

Read before the Kansas State Horticultural Society, December —, 1889,
By CHAS. W. MURTFELDT, of Kirkwood, Mo.

Mr. President and Fellow Members of Kansas Horticultural Society:

The remarks which I shall offer on this occasion will be confined to apples and pears, especially the last named. There are certainly two distinct periods of ripeness—one, the proper time to gather the fruit, and the other when they are in perfection for use as dessert fruit. Of course everybody of common sense knows that when the first stage of ripeness is reached these fruits are quite fit and wholesome for all culinary purposes. It requires some careful experience and study also to know just when the different varieties of apples and pears are in perfect condition, taking location, latitude and exposure of orchard into consideration.

Of the early summer varieties of apples, viz: Carolina Red June, Yellow June and Early Harvest, allow me to remark that the first named ripens its fruit consecutively, a few at a time, for a month or so, and is therefore very desirable as a family apple. When highly cultivated, as it always should be, and grown in large quantities, it is also a desirable market fruit, being of a beautiful color and of medium size. All three sorts first named are fit for use even before the seeds are brown, yet they are wholesome and of best flavor when fully ripe.

The autumn varieties of apples will keep some time after they are fully ripe, but when shipped to a distance they must be consumed soon after they reach their destination. And let me hint just here that one or two partially decayed specimens in a package will soon spoil all the rest, hence only the most perfect fruit should be shipped.

Of winter varieties, and the best time to gather them, I will offer only a single remark. It is this: Let them hang on the trees as long as possible and yet avoid a killing frost. Middle of October and November is about correct. No arbitrary dates can be given, because seasons vary as well as localities and varieties.

Mr. President, I am fully conscious that very little has been said but what every well-posted orchardist knows; but then every farmer is not a skillful orchardist. At the same time, every farmer worthy of the name ought to cultivate an orchard and ought earnestly and honestly try to become a practical and thorough horticulturist. He should know not only how to grow, to cultivate and dress an orchard so as to produce the best fruits, but also to make the best use of it when grown and secured. The object of this society is to teach this. Mr. President, allow me to give the very reason which prompted me to write this paper and present it at this time. As is well known, St. Louis county, and especially Kirkwood and vicinity, is well adapted for the cultivation of pears. They grow and bear profusely in every garden, orchard or yard; but for the want of a little information hundreds of bushels of the very choicest sorts are annually allowed to decay or are being fed to cattle. Now, I think with you and all other good orchardists, that this is a great waste and ought to be stopped, not only in Kirkwood, but everywhere in and out of our State, because there are few, very few, people who do not relish and enjoy a perfectly ripened pear. Like a friend of mine, when offered a plate and knife to partake of a few Seckels, he said: "No, thank you; when I eat a pear there is nothing left but the stem."

Broadly speaking, it may be stated that no variety of pears ought to be allowed to fully ripen on the tree,

except the Seckel. The authority I am about to quote frequently adds, "will keep to November, December or January, as the case may be, when ripened in the house." As to the question, "When, then, ought a pear to be gathered?" I answered, "As soon as the seeds are brown, and when by lifting it with the hand it readily becomes detached from the branch, the stem adhering to the fruit." What next? Gather carefully without bruising and place in shallow drawers in a cool place; if possible, wrap carefully in papers, just like oranges are treated. You will be surprised to see how beautifully they will color up and ripen under this treatment. Never try to push your thumb into the fruit (any fruit), but use the whole hand moderately, and when you discover the fruit to yield a little to the pressure, your pear is in perfection. Then there will be no need of such a plaint as this: "I have some fine pears; my trees bear well and the pears are of good size, but they all rot at the core and do not keep at all. How must I treat them? Can the fault be in the soil?" Such questions are repeated every year, and thus far the losses continue also.

Should my humble effort find a place in your annual report, the data above given should furnish a partial guide to obviate the evil; and let me add, that every member of this Society should know from the name of the variety, when, all things being equal, it will be in season. Many sorts shipped from California to our markets ripen in transit; therefore, and just because of this, scarcely any fruit from that quarter reaches us in such perfection as do pears.

Let me promise, also, that in naming 'the season of leading sorts Mr. Chas. Downing, whom I now intend to quote, lived at Newburgh, on the Hudson (his standpoint), and we must make allowance for his location,

say fully two weeks later than most of Missouri and Kansas, and about equal to northern Illinois and Iowa. Now, with your permission, I will name the leading sorts and add briefly the position and Mr. Downing's judgment as to quality. I know of no higher authority. One other brief remark: The best Kansas and Missouri pears are frequently sold as coming from California. Our pears are certainly of superior flavor, and we ought to have the credit of producing them. Let every grower insist that his pears shall be called the product of his State, and let him label his packages with his own name and locality.

Bartlett, August and September, very good.

Beurre Bosc, September and October, best.

Beurre Clairgeau, October to January, good.

Beurre d'Anjou, October to November, very good.

Beurre Diel, September to December, very good.

Beurre Hardy, September and October, very good.

Beurre Superfine, all of October, very good to best.

Bloodgood, July and August very good.

Buffum, September, very good.

Clapp's Favorite, August and September, very good.

Dearborn Seedling, August, very good.

Dix, October and November, very good to best.

Doyenne Boussock, September and October, very good.

Doyenne d'Alencon, December to April, very good.

Doyenne d'Ete, July, good to very good.

Doyenne Gray, October and many weeks, best.

Duchess d'Angouleme, October, very good.

Easter Beurre, January to March, very good.

Flemish Beauty, September, very good.

Glou Morceau, December, good to very good.

Goodale, October, very good.

Howell, September and October, very good.

Kirtland, August and September, very good to best.

Louise Bonne d'Jersey, September and October, good to very good.

Onandago or Swan's Orange, September to November, good to very good.

Osband's Summer, July and August, very good.

Seckel, August to October, (well known as the standard of excellence.—C. W. M.)

Sheldon, October, very good.

Stevens' Genesee, August and September, good to very good.

Summer Bon Cretien, August and September, tender, melting, juicy.

Tyson, August and September, very good to best.

Urbaniste, September and October, very good to best.

Vicar of Wakefield, November to January, juicy, with good, spicy flavor.

White Doyenne, October, flesh juicy and melting.

Winter Nelis, December and January, best.

Any one cultivating a greater variety or desiring a larger list can, at his own inclination, consult the best authorities.

ESSAY.

BY PROF. CHARLES S. CRANDAL, OF COLORADO AGRICULTURAL COLLEGE,
FORT COLLINS.

One of the recent additions to the list of destructive insects in our State is the Plum Curculio. I am informed that it is as yet known only in a few localities; but having commenced its depredations there is every reason to believe that it will spread until every plum-grower in the State has an opportunity to make its acquaintance. In view of the probable spread of this insect I have thought that a word concerning it and the methods for its extermination might not be out of place.

In most of the States east of us the Curculio is well known, and so destructive has it been that in certain localities the growing of plums has been entirely given up. It is by no means a new pest, but was known as an enemy to the plum more than a century ago. It was described by Herbst in 1797 and named *Curculio Nenuphar*. Afterward the name was changed, and it is now known as *Corotrachelus Nenuphar*. It is an American species, and its natural food plant is the common wild plum. As the Potato Beetle found in the vigorous plants of the cultivated potato a food more to its taste than the wild plant, so the Curculio has found the cultivated plums more attractive than the native wild ones, and on them it multiplies with surprising rapidity.

The perfect insect is a beetle, about one-fifth of an inch in length; dark brown, marked with white, yellow and black. The wing covers and thorax are ridged and roughened. The snout is long, and when not in use is curved down between the forelegs. The beetle appears in early spring as soon as the fruit is set. The egg laying

commences and continues for the greater part of summer. The insect first punctures the fruit with the snout, and having formed a cavity of sufficient size, turns about and deposits a single egg. Turning again, it forces the egg to the bottom of the cavity with the snout, and then proceeds to cut the crescent, which is so characteristic a mark of this species. The whole operation may take about five minutes, and each female will repeat the operation from fifteen to thirty times, or until the egg supply is exhausted. The eggs soon hatch. The larvæ eats its way to the stone and feeds around it. Infested plums soon fall, and when the larvæ have reached maturity they pass out of the fruit and into the ground to pupate. In from four to five weeks the beetle emerges, remaining over winter in this state, hidden away under boards or other rubbish on the ground.

The Curculio does not confine its work to the plum, but often does great damage to cherries, and it frequently works upon apples and peaches.

The list of remedies that have been recommended for the destruction or driving away of the Curculio is a long one. The earlier attempts to fight the pest were confined to the placing among or upon the trees substances disagreeable to the insect, thus driving it to seek food and places for depositing eggs elsewhere. Ashes, lime, plaster, mixtures of carbolic acid, lye, and other strong smelling substances with lime or plaster, burning tar and sulphur, and a host of other remedies were at various times tried; sometimes with reported success and often with only temporary benefit.

About the year 1831, Mr. David Thomas discovered that any sudden jarring of the tree caused the insect to curl up and drop to the ground, and he introduced the practice of jarring and catching the insects upon a sheet spread under the tree. This method is still practiced

to some extent, and various contrivances have been invented to facilitate the work. The jarring process is best applied at evening or in the early morning, for the reason that the beetles are then most active. During the day they usually remain quietly hidden. Jarring should commence as soon as the tree blooms and should be continued for four or five weeks.

Within a very few years it has been discovered that the arsenites were available as a remedy for Curculio. Entomologists for a long time held that spraying would do no good, because all the damage was done by the larvæ, and they were within the fruit beyond the reach of applications of this character. Observation and experiment have now demonstrated that the beetles are quite voracious, feeding freely not only upon the leaves but upon the fruit, and this fact brings them within reach of arsenical solutions applied to the trees by spraying.

At several of the Experiment Stations this remedy has been tried, and the reports as to its efficacy are unanimous. The most elaborate series of experiments was that conducted by Mr. C. M. Weed, of the Ohio Station, upon cherries. In his report he shows that three-quarters of the fruit liable to injury was saved.

For spraying either Paris Green or London Purple may be used. My preference is for the latter, as it is much cheaper and just as effective. In the preparation of the mixture care should be taken to secure just that degree of strength necessary to do the work required; an excess of poison is not only wasteful, but it may cause damage by killing the foliage. There is often difficulty in determining the proper proportions to use, because of the fact that the poisons as sold by dealers vary greatly in strength. Pure Paris Green contains about fifty-seven per cent. of arsenic, and this amount may vary in

the commercial article down to twenty-five per cent. London Purple varies in the same way. Samples have been analyzed which contained fifty-five per cent. of arsenic; others have shown less than forty per cent. An average sample may contain about forty-five per cent. Many of the reports of damage to foliage, as well as the reports of utter inefficiency, could no doubt be traced to this variation in the strength of the poisons used.

In preparing the mixtures for spraying it should be remembered that London Purple is much lighter than Paris Green; a given weight of London Purple is of about twice the bulk as the same weight of Paris Green.

The formula usually given for spraying apple trees is one pound of the poison to one hundred gallons of water. This is stronger than it need be. One pound to one hundred and fifty gallons will prove just as effective unless you chance to get a badly adulterated article of poison. For the Plum Curculio one pound of Paris Green or London Purple to two hundred gallons of water is strong enough, a greater strength is liable to scorch the leaves which are more susceptible to injury of this kind than apple leaves. Paris Green mixtures must be continually agitated in order to keep the poison in suspension. London Purple being so much lighter is held much longer in suspension and less attention to agitation is needed.

In preparing London Purple first mix into a smooth paste with a small quantity of water and then add to the quantity of water necessary to give the requisite strength.

In view of the uncertain strength of the poisons, I would recommend as a safe practice, that the mixture be tried first upon a single tree before putting it to general use. Spraying should commence at the time of

blooming and should be repeated twice at intervals of ten days. If frequent rains occur additional applications will be necessary.

**THE PREMIUM EXHIBITORS OF FRUITS AND FLOWERS
AT THE PUEBLO STATE EXHIBITION, 1889.**

AWARDS IN FLORAL DEPARTMENT.

Victor Johnson, Pueblo, best assortment and design of cut flowers, first premium.

M. Bowman, Pueblo, best assortment and design of cut flowers, second.

Mrs. J. N. Carlile, Pueblo, best specimen of dahlias, six varieties, first.

Victor Johnson, Pueblo, best specimen of dahlias, six varieties, second.

Victor Johnson, Pueblo, best specimen of roses, five varieties, first.

M. Bowman, Pueblo, best specimen of roses, five varieties, second.

M. Bowman, Pueblo, best specimen of verbenas, six varieties, first.

Mrs. Edson, Pueblo, best specimen of verbenas, six varieties, second.

M. Bowman, Pueblo, best and most tastefully arranged bouquet, first.

Victor Johnson, Pueblo, best and most tastefully arranged bouquet, second.

M. Bowman, Pueblo, best and largest variety of greenhouse plants, first.

Victor Johnson, Pueblo, best and largest variety of greenhouse plants, second.

M. Bowman, Pueblo, best collection of foliage plants, first.

Victor Johnson, Pueblo, best collection of foliage plants, second.

M. Bowman, Pueblo, best collection of carefully arranged plants in hanging baskets, first.

Victor Johnson, Pueblo, best collection of begonias, first.

M. Bowman, Pueblo, best collection of begonias, second.

M. Bowman, Pueblo, best collection of pansies, first.

Victor Johnson, Pueblo, best collection of pansies, second.

M. Bowman, Pueblo, best collection of double geraniums, first.

Victor Johnson, Pueblo, best collection of double geraniums, second.

M. Bowman, Pueblo, best collection of single geraniums, first.

M. Bowman, Pueblo, best collection of climbing vines, first.

Victor Johnson, Pueblo, best collection of climbing vines, second.

M. Bowman, Pueblo, best collection of palm trees, first.

Victor Johnson, Pueblo, best collection of palm trees, second.

M. Bowman, Pueblo, best collection of decorative plants, first.

Victor Johnson, Pueblo, best collection of decorative plants, second.

Mrs. Edson, Pueblo, most beautiful collection of Colorado wild flowers on toilet stand, first.

W. T. Morgan, Pueblo, most beautiful collection of Colorado wild flowers on toilet stand, second.

S. H. Stephens, Pueblo, best collection of taxidermy, first.

PREMIUMS ON FRUIT.

Fremont County, Cañon City, best display of fruits by any county in Colorado, first.

Delta County, Delta, best display of fruits by any county in Colorado, second.

Jefferson, Denver, best display of fruits by any county in Colorado, third.

S. Wade, Paonia, Delta County, best display of Colorado fruits grown by one person, first.

John Gravestock, Cañon City, best display of Colorado fruits grown by one person, second.

W. B. Felton, Cañon City, best display of Colorado apples grown by one person, first.

S. Wade, Paonia, Delta County, best display of apples grown by one person, second.

S. Wade, Paonia, Delta County, best display of grapes grown by one person, first.

John Gravestock, Cañon City, best display of grapes grown by one person, second.

W. C. Catlin, Cañon City, best display of pears grown by one person, first.

W. S. Coburn, Paonia, Delta County, best display of pears grown by one person, second.

S. Bradbury, Cañon City, best display of plate grapes, any variety, first.

Jacob Haver, Pueblo, best display of plate grapes, any variety, second.

A. A. Ireland, Cañon City, best display of plate pears, any variety, first.

B. F. Rockafellow, Cañon City, best display of plate pears, any variety, second.

A. D. Cooper, Cañon City, best display of plate peaches, any variety, first.

H. F. Fulton, Pueblo, best display of peaches, any variety, second.

W. B. Felton, Cañon City, best display of plate quinces, any variety, first.

Anson S. Rudd, Cañon City, best plate of quinces, any variety, second.

Eugene Weston, Cañon City, best plate of plums, any variety, first.

John Gravestock, Cañon City, best plate of plums, any variety, second.

S. Wade, Paonia, Delta County, best plate of apricots, any variety, first.

John Brierly, Boulder, best plate of Siberian Crab Apples, any variety, first.

S. Wade, Paonia, Delta County, best plate of Siberian Crab Apples, any variety, second.

G. Gulick, Cañon City, best quart of fresh strawberries, first.

F. A. Barnard, Pueblo, best quart of fresh strawberries, second.

William Locke, Fannington, San Juan County, N. M., best and largest number of varieties of apples grown by one person, first.

W. B. Felton, Cañon City, best and largest number of varieties of apples grown by one person, second.

S. Wade, Paonia, Delta County, best and largest number of varieties of apples grown by one person, third.

R. A. Gardner, Cañon City, best five fall varieties of apples, first.

R. A. Gardner, Cañon City, best five winter varieties of apples, first.

B. F. Rockafellow, Cañon City, best plate of apples, any variety, first.

Wm. Locke, Fannington, San Juan County, N. M., best five varieties of apples for quality, first.

R. W. Shropshire, Whitewater, Mesa County, best three varieties of apples for commercial use, first.

W. S. Coburn, Paonia, Delta County, best display of nursery stock by one person, first.

LIST OF FRUIT EXHIBITORS.

The following is a list of fruits exhibited at the State Fruit Exhibit, at Pueblo, Colorado, October 3 to 9, 1889, under the auspices of the State Horticultural and Forestry Association:

FREMONT COUNTY.

W. B. FELTON.

Pears—Sheldon, Buerre Bosc, Buerre d'Anjou, Bufum, Second Bloom Bartlett, Seckel, nine varieties unnamed.

Apples—Sweet, Vandever, Pippin, Limber Twig, Wolf River, Red Pearmain, Martha Crab, Virginia Seedling, Wine Sap, Fall Pippin, Ben Davis, Seek-no-

Further, Tallman's Sweet, Grimes' Golden Pippin, Perry Russet, Hylsop Crab, Golden Russet, Jonathan, Willow Twig, Hall's Crab, Baldwin, Fulton, Walbridge, Dominie, Fameuse or Snow, Yellow Bellflower, Northern Spy, Fall Pippin, six varieties unnamed.

Quince—Orange.

Bottled Fruits—Pears, German Prunes, Plums, Peaches, Nectarines, Cherries.

JOHN GRAVESTOCK.

Peaches—Seedlings, Nos. 14, 8, 3, 11, 15, 10, 13, 5, 7, 2, 4, 6, 9, 12.

Pears—Le Conte, Bartlett, Bouquet, Seckel, Mount Vernon, Vicar of Wakefield, Louise Bon d'Jersey, Kieffer, Duchess.

Apples—Maverick Sweet, Family, Willow Twig, Missouri Pippin, Roman Beauty, Striped Winter Pearmain, Second Duchess of Oldenburg, Seedling Rhode Island Greening, Carter's Blue, Wealthy, Winter Pearmain, Ben Davis, Rawle's Janet, Flora, Bellflower, Baldwin, Kenard's Choice, Fameuse, Lowell, Twenty Ounce, Alexander, Rankin's Favorite, Rhode Island Greening, Jonathan, Fall Queen, Walbridge, Grimes' Golden, Wine Sap, Oconee Greening, Maiden Blush, Limber Twig.

Plums—Imperial Gage, Pond's Seedling, Yellow Egg, Shropshire Damson, Duane's Purple, Prince's Yellow Gage, Lombard, Smith's Orleans.

Grapes—Fremont or Helm Seedlings, Brighton Seedlings, Nos. 8, 9, 6, 5, 4, 7, 10, 4, 2, Chasselas Seedling Nos. 2 and 1, Black Hamburg, Martha, Ionia, Brighton, Goethe, Lady, Pocklington, Muscat of Alexander, Mission, Muscatel, Catawba, Concord, Niagara, Salem, Duchess, Prentiss, Gravestock's Seedling. No Colorado on exhibition.

R. A. GARDNER.

Apples—Lady, Wagner, Snow, Plum Cider, Red Winter Pearmain, Gardner's Seedling, Northern Spy, Hyslop Crab, Pewaukee, Bellflower, Royal, Limber Twig, Rawle's Janet, Seek-no-Further, Walbridge, Maiden Blush, Improved Wine Sap, Hall's Crab, Missouri Pippin, Ben Davis.

JOHN LOCKE.

Peaches—Forty-eight seedlings.

Apples—Snow, Cole's Quince, Flora, Bellflower, Virginia Greening, Wine Sap, Ben Davis, Pound, Vandever Pippin, Rawle's Janet, Isham Sweet, Willow Twig, Rambo, Golden Pippin, Early Fall Rambo, eleven unnamed.

Pears—Bartlett, Sheldon, three unnamed.

TOOF BROTHERS.

Apples—Eighty-three varieties of seedlings, Hyslop Crab, Siberian Crab.

Pears—Seedling No. 17, pear grafted on quince.

JESSE FRAZER.

Apples—Ben Davis, Cooper, Baldwin, Vandever Pippin, Fameuse, Rambo, Grimes' Golden, Keswick's Catlin, Mountain Sweet, Jonathan, Northern Spy, King of Thompson County, Walbridge, Colorado Orange, Willow Twig, King, Roxbury Russet, Wine Sap, Sweet Romanite, Yellow Bellflower, Sweet Pear, Perry Russet, Autumn Strawberry, Striped Gilliflower, Jeffrey, Romanite, Missouri Pippin, Smoke House, Red Winter Pearmain, Maiden Blush, Seek-no-Further, Huntsman's Favorite, Golden Russet, Rawle's Janet.

Pears—Seckel, Sheldon, Flemish Beauty, Winter, twelve unnamed.

Peaches—Four varieties, unnamed.

W. C. CATLIN.

Apples—Colorado Red Streak, Pippin, Walbridge, Rawle's Janet, Romanite, Twenty Ounce, Gilliflower, Jonathan, Ben Davis, Maiden's Blush, Stump, Rambo, Catlin Seedling, Melano, Summer Pearmain, Plum Cider, Water Case, Winter Pearmain, Catlin Seedling No. 2, Transcendent, Nick-a-Jack, Haas, Kenard Choice, Snow, Fall Strawberry, Wine, Sweet Pear, Northern Sweet, Wealthy, Tallman's Sweet, Willow Twig.

Pears—Duchess, Sleeping Beauty, Congress, San Juan, Bartlett.

Seedling peaches.

Grapes—Elvira, Catawba, Sultana, Concord, Salem, Iona, Muscat, Isabella, Flaming Tokay.

MRS. S. A. SCOTT.

Apples—Paradise Sweet, Willow Twig, Hyslop Crab, Ben Davis, Limber Twig, Red Streak, Rawle's Janet, Spice River Sweet, Fall Top.

Pears—Clapp's Favorite, Monarch.

Peaches—Crawford's Late, Crawford's Early.

L. J. TEMPLIN.

Apples—Ben Davis, Golden Beauty, Lawver, Rawle's Janet, Jonathan, Templin's Seedling Peach.

WILLIAM BAKER.

Apples—Hyslop Crab, Rawle's Janet, Dominie, Sweeting, Lawyer, Wine Sap, Jonathan, Limber Twig, Red Russian, Haas, Empire Russian, Uncle Sam, Missouri Pippin, Fall Pippin, Maiden's Blush, Red Winter Pearmain.

D. C. GREEN.

Seventeen plates of apples.

Three plates of pears.

L. U. COFFMAN.

Apples—Pewaukee, Ben Davis, five for name, Autumn Snow.

A plate of pears for name, one plate Flemish Beauty.
Three plates of peaches, unnamed.

JEFF TONG.

Apples—Tong's Seedling, Ben Davis, two unnamed.

JOHN PIERCE.

Apples—Ben Davis, Wine Sap, Jonathan, six unnamed.

Thirteen plates of peaches, unnamed.

JOHN KELLY.

Apples—Wine Sap, Willow Twig, Walbridge, Ben Davis, Rawle's Janet, one unnamed.

W. B. FOWLER.

Apples—Wine Sap, Ben Davis, Pewaukee, Striped Gilliflower.

Pears—Duchess, Standard, Louise Bon de Jersey.

TRUE BLANCETT.

Six plates apples unnamed.

Two plates pears unnamed.

JAMES G. HARVEY.

Four plates apples unnamed.

W. A. STOVER.

Grapes—Golden Chasselas, Black Hamburg.

Apples—Wine Sap, Willow Twig, Ben Davis, Jonathan, Rawle's Janet, Gilpin, Missouri Pippin.

W. H. TROUT.

Apples—Bellflower, Wine Sap, Ben Davis, Limber Twig, Jonathan, Pewaukee.

HENRY SARTOR.

Apples—Pewaukee, Maiden's Blush, Wine Sap, Lawver, Ben Davis.

MRS. PAUL S. ROSS.

Grapes—Golden Pocklington, Concord, Amber Queen.

Apples—Walbridge, Winter Pearmain, Northern Spy, Ben Davis, Madam Ross Seedling, one unnamed.

One plate pears unnamed.

E. B. ALLING.

Apples—Wealthy, one unnamed.

Pears—Flemish Beauty, one unnamed.

A. D. COOPER.

Four Cooper Seedling peaches.

Ben Davis apples.

Flemish Beauty pears.

HUNT BROS.

Grapes—Concord, Salem, Goethe, Delaware, Duchess.

Apples—Jupiter, New York Pippin, one unnamed, Smith's Cider.

Pears—Buerre d'Anjou.

J. W. MILSOM.

Pears—Kieffer, Duchess, one unnamed, Flemish Beauty, Bartlett.

Apples—Willow Twig, Ben Davis, Jonathan, one unnamed.

GEORGE O. BALDWIN.

Grapes—Barry, Brighton, Lindley, Wilder, Delaware, Elvira, Missouri Riesling, Martha, Lady.

Plums—Pound's Seedling, Green Gage, Lombard, Parker's Seedling, Imperial Gage, Blue Damson.

Pears—Duchess d'Angouleme, Seckel, Tres Donard, Kieffer, Flemish Beauty.

Apples—Rawle's Janet, Ben Davis, Broadwell Sweet, Wagener, Wine Sap, Roman Beauty, Hyslop Crab, Walbridge, Missouri Pippin, Tallman's Sweet.

JOHN WILSON.

Grapes—Niagara Goethe.

Two kinds of pears unnamed.

ANSON RUDD.

Apples—Ben Davis, Rudd's Seedling, Fall Wine, Wine Sap, Fall Sweet.

Grapes—Seedless Sultana, two unnamed.

Orange quince.

A. A. IRELAND.

Apples—Smith's Cider, Fallawater, Lawver, Willow Twig, Plum Cider, Rhode Island Greening, Rawle's Janet, Wine Sap, Limber Twig.

Pears—Louise Bon de Jersey, Buerre d'Anjou, Duchess, Seckel, Flemish Beauty, Kieffer.

LYMAN ROBISON.

Apples—Willow Twig, Wine Sap, New York Pippin, Jonathan.

Pears—Kieffer, Hybred, Urbanist, Flemish Beauty, Louise Bon de Jersey.

GEORGE F. M'RAY.

Apples—Ben Davis, Fulton, Bellflower, Fall Pippin, Romanite, Vandever Pippin, Jonathan, Wine Sap, Wealthy, Wagener, Porter, Red Winter Pearmain.

Three plates peaches for name.

Grapes—Agawan, Salem, Isabella, Concord, Catawba, Delaware, Duchess.

MRS. A. M. HAWLEY.

Princess plum.

W. B. M'GEE.

Hyslop crab.

Pears—Emutie L. Hayti, Beya de la Motte, Princess.

J. H. HARRISON.

Pears—Buerre d'Anjou, Mount Vernon, two unnamed.

Plums—Green Gage, German Prune, Damson.

Apples—Standard Crab, Willow Twig, Golden Russet, Seek-no-Further, Russet, Lady Finger, Rawle's Janet, Grimes' Golden, Wealthy Pippin, Yellow Bellflower, Plum Cider, Rambo, Janet, Perry Russet, Red Winter Pearmain, Ben Davis, Missouri Pippin, Lawver, Flora Bell, Wine Sap, Jonathan, ten unnamed.

JAMES CURTIS.

Apples—Ben Davis, Fall Jim, Flora Belle, Wagener, Russian Haas.

JOHN W. JOHNSON.

Apples—Northern Spy, Ben Davis, Fremont Seedling, White Winter Pearmain, Oil Creek Seedling.

W. A. STUMP.

Apples—Walbridge, Alexander, Snow, Roman Beauty, Ben Davis, Limber Twig, Wagener, Rawle's Janet, Sweet Pear, Hyslop Crab, Red Winter Pearmain, Wine, Wine Sap.

DELTA COUNTY.

W. S. COBURN.

Apples—Alexander, Willow Twig, Limber Twig, Haas, Wine Sap, Missouri Pippin, Walbridge, Wagener, Maiden's Blush, Lady Sweet, Sweet Bough, Ben Davis, Wealthy, Hebe, None-such, Yellow Bellflower.

Pears—Duchess d'Angouleme, Buerre d'Anjou, Flemish Beauty, Bartlett, Kieffer, Seckel, S. D. Congress, Le Conte.

Plums—Mooney, German Prune, De Soto, Miner, Native, Pond's Seedling, Kelsey, Japan, Wild Goose.

Peaches—Elberta, Smock, Salway, Stump, Heath Cling, Old Mixen Cling, Henrietta Cling, Governor Garland, George Fourth, Crawford Late, Nos. 1 to 8, common seedling, Nos. 1 to 4, Colorado seedling.

Grapes—Muscat, Zinfandel, Sweetwater, Seedless Sultana, Moore's Early, Concord, Hyland Hardy, Wyoming Red, Empire State.

Crab Apples—Hyslop, Transcendent, Soulard, Queen's Choice, Martha, Yellow Siberian.

S. WADE.

Peaches—Chinee Cling, Crawford, Heath's Cling, Snow, fourteen seedlings.

Bottled—Nectarines, Apricots, Blackberries, Crown-hole Gooseberries, Downing, Jessie Strawberry, Fay's Currants, Early Richmond Cherries.

Plums—French Prunes, Yellow Egg, German Prunes, Lombard, Green Gage, De Weese Native, Damson, Land.

Pears—Duchess, Bartlett, Flemish Beauty, Kieffer.

Grapes—Black Hamburg, Seedless, Sultana, Goethe, Black Malvory, Early Victor, Zinfandel, Jefferson, Mus-

cat of Alexander, Delaware, Clinton, Niagara, Massasoit, Empire State, Hartford, Prolific, Elvira, Concord, Catawba, Salem, Pocklington, Agawam, Ives' Seedling, Brighton, Wyoming Red, Sweetwater, Taylor's Bullet, Telegraph or Christine, Dracot Amber, Lady Washington, Missouri Risiline, Jamesville.

Apples—Pewaukee, Willow Twig, Haas, Bailey's Sweet, Wagener, Missouri Pippin, Rambo, Fameuse or Snow, Ben Davis, Limber Twig, Autumn Strawberry, Rawle's Janet, Maiden's Blush, Tallman's Sweet, Wine Sap, Stark, Keswick's Catlin, McMahon's White, Virginia Greening, Walbridge, White Winter Pearmain, Dominie, Lawver, Jonathan, Duchess, St. Petersburg, six varieties unnamed.

Crab Apples—Siberian, Orange, Transcendent, Martha, Hyslop.

JEFFERSON COUNTY.

JOHN TOBIAS.

Plums—Miner, Bradshaw, Weaver, Cole's Golden Drop, Shropshire Damson, Botan, Forest Rose Seedling.

Apples—Yellow Transparent, Transcendent, two for name, Hyslop, Charlamainoff, Alexander, Wealthy, Yellow Bellflower, Ben Davis, Missouri Pippin, Longfield, Chenango Strawberry, Duchess, Stark, Fameuse, Walbridge, Bordsdorf, White Winter Pearmain, Jonathan, Wine, Rawle's Janet, Golden Beauty Crab, Tallman's Sweet, Hoylon.

Pears—Flemish Beauty.

HARPER DAVIS.

Two plates of pears.

J. J. YOUNG.

Apples—Lady, Maiden's Blush.

HENRY GREEN.

Apples—Willow Twig, White Winter Pearmain, one unnamed.

CHARLES WILLIAMSON.

Apples—Duchess of Oldenburg, Alexander, Lawver.
Two plates of pears unnamed.

MRS. COOK.

Five plates of pears unnamed.

WILLIAM LEE.

Apples—Harvest Queen, Fall Baldwin, Summer Queen, Wagener, Golden Russet, St. Lawrence Seedling, Briar Sweet, Maiden's Blush, Smith's Cider, seven unnamed.

MR. M'ALROY.

Apples—Summer Queen, three unnamed, Red Winter Pearmain, Tulpehocken, Grimes' Golden, Maiden's Blush, Wagener, Jonathan.

DAVID LEE.

Apples—Pewaukee, White Winter Pearmain, Haas, Ben Davis, Wealthy, one unnamed.

Pears—Flemish Beauty.

J. BROWN.

Apples—Willow Twig, Autumn Strawberry, Wine, Seedling, one unnamed.

E. BOSLY.

Apples—Bellflower, Snow, four unnamed, Jonathan, Duchess of Oldenburg, Rawle's Janet.

Pears—Bartlett, Flemish Beauty, two unnamed.

DAVID BROTHERS.

Apples—Duchess of Oldenburg, Rawle's Janet, Pewaukee, Little Romanite, Northern Spy, three unnamed, Yellow Siberian, Snow, Autumn Strawberry, Jonathan, Wealthy, Whitney No. 20, Hoylone, Alexander, Missouri Pippin, Hyslop Crab, Ben Davis.

Pears—Bartlett, two unnamed.

H. STEWART.

Apples—Willow Twig, Plum Cider, two unnamed, Pewaukee, Wine Sap, Snow, Wealthy, Hyslop.

MRS. BAKER.

Apples—Roxbury, Russet, Fameuse, three unnamed, Janet, Wagener, Red Pearmain, Sava, Ben Davis, Limber Twig, Autumn Strawberry, Perry Russet, Loveland Crab, Large Romanite, Romanite, Winter Wine, Tallman's Sweet.

Pears—Sheldon, two unnamed, Flemish Beauty, Bartlett.

HENRY LEE.

Plums—Green Gage.

Apples—Seek-no-Further, Paradise, Briar Sweet, Large Crab, Flora Bell, Perry Russet, Ben Davis, two unnamed.

W. M. BENEDICT.

Apples—Stark, Whitney No. 20, Cole's Quince, Tallman's Sweet, Transcendent Crab, Northern Spy, two unnamed.

MRS. RICHARDS.

Apples—Swaar, New York Greening.

Pears—Two unnamed, Flemish Beauty, Seckel, Louise, Bon de Jersey.

BOULDER COUNTY.

MRS. PERRY WHITE.

Apples—Haas, one unnamed.

M. G. SMITH.

Grapes—Lindley.*Peaches*—Seven seedlings.

J. A. DAVIS.

Plums—Prince Albert, German Prune.

E. J. PERRIN.

Plums—One unnamed.

R. WOODBURY.

Plums—Peach Plum, Geass, two seedlings.

GEORGE WEBSTER.

Apples—Pewaukee, Perry Russet, Large Romanite,
two seedlings, R. R. Pearmain.

JOHN M. GOSS.

Apples—Haas, Fall Strip, Utter's Red.

M'INTOSH.

Apples—Pewaukee, one unnamed.*Pears*—Flemish Beauty.

GEORGE HEPNER.

Apples—Rock Russet, Maiden's Blush, Rambo, Lim-
ber Twig, Northern Spy, Wealthy.

JOHN BRIERLEY.

Apples—Five Ben Davis Seedlings, Transcendent
Crab.*Grapes*—Agawam, Champion, one unnamed, Martha,
Brighton, Delaware, Vergenese, Telegraph, Hartford.*Plums*—Miner, Weaver, Shropshire.*Pears*—Bartlett.

ARAPAHOE COUNTY.

F. E. BIRD.

Apples—Pewaukee, Alexander, two unnamed, Wealthy, Autumn Strawberry, Ben Davis, Isham Sweet.

MESA COUNTY.

W. H. COFFMAN.

Apples—Alexander, Isham Sweet, Haas, Ben Davis, Utter's Red, Grindstone, Pewaukee, Tulpehocken, Willow Twig.

Pears—Duchess, Bartlett, Kieffer's Hybrid.

J. R. PENNISTON.

Apples—Tulpehocken, Maine, Ben Davis, Willow Twig.

R. W. SHROPSHIRE.

Apples—Wagener, Pewaukee, Haas, Alexander, Willow Twig, Grindstone, Ben Davis, Hyslop Crab, Wine Sap, White Winter Pearmain.

Pears—Duchess d'Angouleme, Bartlett, Edmonds, Flemish Beauty, Kieffer's Hybrid.

E. BLAINE, Grand Junction.

Apples—Fameuse or Snow, Willow Twig, White Winter Pearmain, Haas, Ben Davis, Alexander.

O. M. OLDS.

Pears—Kieffer's Hybrid, Duchess.

Peaches—Culinary, Henrietta, Skadley, Salvary, Old Milon, Colorado.

Grapes—Muscatel, Flaming Tokay, Malaga, Muscat of Alexander, Emperor.

C. W. STEEL.

Apples—For name.

MONTROSE COUNTY.

WILLIAM NEUGART.

Apples—Rambo, Wagener, Ben Davis.

S. H. NYE.

Apples—Magog, Pumpkin Sweet, Ben Davis, Tallman's Sweet, Rhode Island Greening, Haas.*Pears*—Flemish Beauty, Edmond's Indian Queen, Duchess, Bartlett.**WELD COUNTY.**

R. B. NELSON.

Apples—Jennetin, Ben Davis, August Sweet, Sweet Willow, Hyslop Crab.*Grapes*—Two varieties, unnamed.*Plums*—Green Gage, Weaver, Lombard.**PUEBLO COUNTY.**

A. C. HADEN.

Apples—Pewaukee, Ben Davis, Missouri Pippin, Jennetin, Autumn Strawberry, Russet, Hyslop Crab, three varieties unnamed.

JACOB HAVER.

Plums—Lombard, Miner.*Apples*—White Winter Pearmain, Ben Davis, Missouri Pippin.*Peaches*—Five varieties, seedlings.*Grapes*—Clinton, Pocklington, Niagara, Catawba, Prentis, Concord, Brighton.

H. M. MORSE.

Pears—One variety, unnamed.

S. A. BARNARD.

Apples—Ben Davis, Wine Sap, Willow Twig, Fall Pippin, Jennetin, Jonathan, Russet, seven varieties unnamed.

Pears—Flemish Beauty.

DR. EDSON.

Apples—Ben Davis, Crab, two varieties unnamed.

Grapes—One variety unnamed.

Peaches—Nine varieties, seedlings.

E. F. BARTHOLOMEW.

Pears—Keifer, Lawson, Bartlett, Flemish Beauty, Howell, Louise Bon de Jersey.

Apples—Montreal Beauty Crab, Transcendent Crab.

J. BOWMAN.

Grapes—Clinton, Concord.

Pears—Duchess.

JOHN ROSS.

Peaches—Four Seedling varieties.

Apples—Rhode Island Greening, Ben Davis.

R. A. GILMORE.

Apples—Bellflower, Ben Davis, Rhode Island Greening.

SAN JUAN COUNTY, NEW MEXICO.

WILLIAM LOCKE.

Apples—Ben Davis, Missouri Pippin, W. W. Pearmain, Lawver, Tallman's Sweet, Rawle's Janet, Flora Bell, Tetofsky, Smith's Cider, Haas, Early Pennock, Fall Wine, Dominie, Wythe, Walbridge, Penn Red Streak, English Kitchen, Fameuse, Porter, Lowell, Duchess, Alexander, Little Romanite, Roman Beauty, Wealthy, Pewaukee, for name, Hub, None-Such, Wine Sap, Rambo, Whitney No. 20, G. G. Pippin, for name, Winter May, Jonathan, Hyslop, Montreal Beauty, Golden Beauty, Soulard.

Plums—Green Gage, Blue Damson, Yellow Egg, Chickasaw, and one unnamed.

Pears—Bartlett, Louise Bon de Jersey, Howell, Seckel, Clap's Favorite, and two varieties unnamed.

Peaches—Four varieties unnamed.

L. W. COE.

Apples—Ben Davis, Coal Quince, Rambo, Roman Stem, Pewaukee, Jonathan, Nick-a-Jack, Wine Sap, White Winter Pearmain, Willow Twig, Missouri Pippin, Rawle's Janet, Quaker Beauty, Heath Cling Peach and German Prune.

D. J. CRAIG.

Apples—Ben Davis, Missouri Pippin.

Peaches—Two varieties, seedlings.

A. WYLEY.

Peaches—Four varieties, seedlings.

C. H. M'HENRY.

Peaches—Two varieties, budded.

Apples—Unnamed.

F. M. PIERCE.

Apples—Ben Davis, Rawle's Janet, two varieties unnamed.

Peaches—Crawford late, three varieties of seedlings.

Grapes—Black Hamburg, Seedless Sultana, White Sweet Water, Concord unnamed.

D. BALDWIN.

Grapes—Muscat.

APPLES AS MEDICINE.

EXPERT TESTIMONY AS TO THEIR NUMEROUS GOOD QUALITIES.

[*From the Hospital.*]

Chemically the apple is composed of vegetable fibre: albumen, sugar, gum chlorophyll, malic acid, gallic acid, lime and much water. Furthermore, the German analysts say that the apple contains a larger percentage of phosphorus than any other fruit or vegetable. This phosphorus is admirably adapted for renewing the essential nervous matter, lethicin, of the brain and spinal cord. It is, perhaps, for the same reason, rudely understood, that old Scandinavian traditions represent the apple as the food of the gods, who, when they felt themselves to be growing feeble and infirm, resorted to this fruit for renewing their powers of mind and body. Also, the acids of the apple are of signal use for men of sedentary habits, whose livers are sluggish in action; these acids serving to eliminate from the body noxious matter, which, if retained, would make the brain heavy and dull, or bring about jaundice or skin eruptions and troubles. Some such an experience must have led to our custom of taking apple sauce with roast pork, rich goose and like dishes.

The malic acid of ripe apples, either raw or cooked, will neutralize any excess of chalky matter engendered by eating too much meat. It is also the fact that such fresh fruits as the apple, the pear and the plum, when taken ripe and without sugar, diminish acidity in the stomach rather than provoke it. Their vegetable salts and juices are converted into alkaline carbonates which tend to counteract acidity. A good ripe raw apple is one of the easiest of vegetable substance for the stomach to deal with, the whole process of its digestion being completed in eighty-five minutes. Gerard found that the "pulpe of roasted apples mixed in a wine-quart of faire water and labored together until it comes to be as apple and ale—which we call lambeswool—never faileth in certain diseases of the raines, which myself hath often proved, and gained thereby both crownes and credit." "The paring of an apple, cut somewhat thick, and the inside whereof is laid to hot, burning or running eyes at night, when the party goes to bed; and is tied or bound to the same, doth help the trouble very speedily, and contrary to expectation—an excellent secret."

A poultice made of rotten apples is of very common use in Lincolnshire for the cure of weak or rheumatic eyes. Likewise, in the Hotel des Invalides at Paris an apple poultice is used commonly for inflamed eyes, the apple being roasted and its pulp applied over the eyes without any intervening substance. Long ago it was said apples do easily and speedily pass through the belly; therefore they do mollify the belly; and, for the same reason, a modern maxim teaches that—to eat an apple going to bed, the doctor then will beg his bread.

ARBOR DAY TREE PLANTING.

(Circular No. 9.)

STATE OF COLORADO,
OFFICE OF FOREST COMMISSIONER, }
DENVER, March 28, 1890. }

For the information of school authorities, and others, interested in Arbor Day tree planting, I have appended hereto a copy of the act instituting Arbor Day in this State, together with a few suggestions relating to the transplanting and culture of trees.

The educational features of Arbor Day are not here dwelt upon. It is trusted that the annual observance of the day, by appropriate exercises, and practical lessons in tree planting and culture, will eventually lead to a greater and more general interest in the science of forestry.

EDGAR T. ENSIGN, *Commissioner.*

AN ACT**TO ESTABLISH ARBOR DAY.**

Be it enacted by the General Assembly of the State of Colorado:

SECTION 1. The third Friday of April of each year shall be set apart and known as Arbor Day, to be observed by the people of this State in the planting of forest trees, for the benefit and adornment of public and private grounds, places and ways, and in such other efforts and undertakings as shall be in harmony with the general character of the day so established; *Provided*, That the actual planting of trees may be done on the day designated, or at such other most convenient time as may best conform to local climatic conditions, such other time to be designated and due notice thereof given by the several County Superintendents of Schools for their respective counties.

SEC. 2. The day, as above designated, shall be a holiday in all public schools in the State, and school

officers and teachers are required to have the schools under their respective charge, observe the day by the planting of trees or other appropriate exercises.

SEC. 3. Annually, at the proper season, the Governor shall issue a proclamation, calling the attention of the people to the provisions of this act, and recommending and enjoining its due observance. The Superintendent of Public Instruction and the respective County Superintendents of Schools shall also promote by all proper means the observance of the day, and the said County Superintendents of Schools shall make annual reports to the State Forest Commissioner, of the action taken in this behalf in their respective counties.

DIRECTIONS FOR PLANTING.

When to Plant—The coming of Spring varies so greatly in different parts of the State that no single day could be chosen that would be seasonable for all localities. The transplanting should be done after the ground is entirely clear of frost, and at about the time of the commencement of the Spring rains, if such rains can be anticipated with reasonable certainty. A cloudy day rather than a sunny one, should be selected for the work.

Where to Plant—It is worse than useless to plant trees in a situation where they cannot be properly protected and watered and made to thrive. I assume that in this State, all trees, even the most hardy, will, after transplanting, require irrigating for a longer or a shorter period. Therefore let that consideration influence the choice of site.

In planting adjacent to school buildings, the boundaries of the walk along the street or road are suitable places for rows of trees. Within the grounds trees

should be planted in groups (disposed naturally), rather than placed singly or in formal "clumps;" and to preserve in the grounds a lawn-like appearance, the planting should mainly be near the boundaries, or corners, or at the rear. Generally, it is not well to plant trees in close proximity to the school building. Make it a point to plant so as to screen the out-buildings, or cut off any objectionable view. In determining the situation of groups or individual trees, make due allowance for the space they will occupy when grown.

Choice of Trees—It may be said at the outset that trees from well-managed nurseries are preferable to those grown in the forest, because their root-system is better prepared for transplanting.

As a rule, young and small trees, when transplanted, make a more vigorous, thrifty growth than do trees of larger size and greater age. In school grounds it is usually better to plant hardy *deciduous* trees than *conifers*. To insure success with the latter, more skillful treatment is demanded than they would be likely to receive in the instance under consideration.

Among the hardier forest trees suitable for planting in this State, especially in the plains region, are the Cottonwood (broad leaved) Balm of Gilead, Russian Mulberry, American White Ash, Black Locust, Honey Locust, Western Gray Willow and Wild Black Cherry. In localities south of the Arkansas-Platte divide the Osage Orange and Catalpa Speciosa might be tried.

The Cottonwood, of which there are several varieties, is the pioneer tree of the plains. It is hardier and has a more vigorous growth in this region than other species of which we have knowledge. The broad-leaved variety is superior to the others. It is exceedingly useful for street and road-side planting, where speedy results are sought. Where irrigation is freely practiced the Hick-

ory, Butternut, Black Walnut, White Elm, Linden, Box Elder and other varieties of Maple are likely to do well.

Several species of trees, native to the State, if carefully planted, would be likely to thrive in altitudes as great as nine to eleven thousand feet. Among those worthy of trial in such situations may be named the Cottonwood, Aspen ("Quaking Asp"), Box Alder, Dwarf Maple, Alder and Wild Cherry.

Evergreens, when healthful and perfect, with drooping branches sweeping the ground, are beautiful objects. To successfully transplant and grow them is a work of skill, but the extra labor and difficulty in such cases, often secures the most gratifying results. Though not recommended for Arbor Day planting by schools, they might be freely used under other and more favorable circumstances.

Method of Transplanting—Where schools or other organizations engage in the work, experienced tree-planters should do the actual planting, heaps of earth being left for those to fill in who perform the more ceremonious parts.

Before bringing the trees on the ground, dig large holes and procure plenty of rich, fine soil to fill in around the roots of the trees. If manure of any kind is used, do not place it in contact with the roots. In taking up the trees be careful to save, with each, all the roots possible, especially the fine or fibrous ones, and remove the trees at once to the place where they are to stand. Do not allow them to be long exposed to the sun or wind. If it seems necessary, shorten the side branches (never the leader) to correspond with loss of root which the trees may have sustained. Cut off smoothly the rough or broken ends of roots, spread them out at length in the hole—for good "anchorage" and further nutrition

of the trees. Set the trees about the depth they naturally grew, wet the roots thoroughly and sift in around them good, fine soil. Press the earth down firmly, leave no spaces, water (though not too freely) while filling in, and avoid heaping the earth around the trunks. *A close contact of the soil with the rootlets, is the success in planting.* Mulch the surface around the trees with leaves, straw or litter of some kind.

A well-known authority has summarized the elements of success in tree planting as follows:

First—Trees suitable to soil and surrounding conditions.

Second—A well developed root-system, kept in living condition.

Third—Wide holes and mellow soil.

Fourth—Firm packing of soil around the roots.

After Care—After the trees are transplanted, secure them from harm in some effective way. Those along the street or road-side should be protected by strong posts or rails, placed at such a distance outside of the trees that the latter may be beyond the reach of horses. The barbarism of hitching horses to young and growing trees should be suppressed. School children should also be taught to respect the trees and the importance of letting them alone. Each tree planted in school grounds might be placed in charge of, and named for, some meritorious pupil; the child so honored to be held responsible for the care and growth of the tree. It is cruel and wasteful to remove a thrifty tree from its home and let it perish for want of care. Treat it as a friend; nourish and protect it, and in after years it will amply reward you with its shade and beauty.

CODLIN MOTH AND LEAF HOPPER.

By W. B. FELTON, Cañon City.

The two spraying machines, ordered by the Fremont County Horticultural Society, have arrived. These machines were ordered for the purpose of spraying trees to destroy the Codlin Moth, or grape vines for the Grape Leaf Hopper, or for any other such purpose, for those persons who haven't enough fruit to warrant them in going to the expense of buying a spraying outfit. The use of these two machines, if properly handled, will be of vast benefit to this community. It is necessary now to get some one or two persons to take charge of these machines and do the spraying for such parties as have no sprayer and charge a reasonable amount for the work. The Horticultural Society invested in these machines for the public good, and now they are here ready for work, every person having fruit trees or vines and no sprayer should secure the use of one of them.

By united effort the insect pests, that if left to their own course, will destroy the fruit interests of this section may be, if not entirely extinguished, kept within such reasonable bounds that but little damage will be done by them to the fruit. It is almost useless for a person to fight these pests if his neighbors let them have their own way. Everyone should do his share. Last year, in our orchard, we pursued the following plan: Lanterns were kept lighted from blooming time till late in the summer for the purpose of catching the Codlin Moth. In July (when the second crop of worms began to appear) we put bandages of cloth around the trunks of the trees. Every week these bandages were removed, the worms killed and the bandages replaced; that was kept up until the apples were harvested. It was esti-

ated, by those who did the work, that one hundred and seventy-five thousand worms (the worms that are transformed into the Codlin Moth) were thus caught and killed. In some instances over two hundred worms were taken from one bandage at one time. With all that work and wholesale slaughter of worms we had many wormy apples, but if that work had not been done it is probable that we would have had hardly a sound apple.

This week those bandages were again removed and about fifteen hundred worms were killed that had crawled into these bandages last fall, after the harvest, and, but for being thus caught, would soon have come out full fledged Codlin Moth and would have stung several thousand apples. During the winter a coat of lime was spread over the orchard, with the hope, that among other good effects, it might destroy such worms as might be in the ground. This season we shall spray the trees twice, once directly after the bloom has fallen and again in about two weeks, with London Purple. When, late in June or early in July, the wormy apples appear they should all be removed from the trees and destroyed before the worms escape therefrom, and then the bandages should be examined the balance of the season. If all would pursue that course faithfully we believe that, while one season might not completely annihilate the Codlin Moth it would nearly do so, and by following it up year after year the result would be to practically annihilate them and everybody would have sound fruit, free from worms. We haven't much faith in the lanterns. At any rate, we know that they alone will not accomplish the desired object.

As to the Grape Leaf-Hopper—they are a pest that must be fought vigorously or our vineyards will all be destroyed. We were not bothered with them till last

year and did nothing to destroy them. Before the close of the season they became very numerous in our vineyard, but the damage was confined to a few California varieties, the Delaware, and a few other tender leaved varieties. If left to increase they soon attack every variety of grape and will destroy the whole crop. They settle on the under side of the grape leaf and suck its substance, breeding thereon and increasing at a marvelous rate. Before the grape has matured they will have taken all the substance from the leaves, which will fall off, leaving the canes bare and the fruit will shrivel up and not mature. We commenced operations against the Leaf-Hopper last fall by cleaning the vineyard of all leaves and rubbish, leaving no harboring places for them to winter. None have been observed up to the present time in our vineyard, but many escaped from the vineyard last fall and wintered among the strawberry vines. They are now quite thick along the edge of the strawberry patch next to the vineyard, and the leaves of the strawberry vines show that they are working on them. We expect that as soon as the grape vines are in leaf they will leave the strawberries and attack the grapes. We propose to clean out these hoppers some way, and may have to try several means before we hit the best way, but our present plan of campaign for this season is: first, to try to burn those now among the strawberry plants. We shall make a large torch of rags, saturated with oil, and passing along through the vines of a warm day, cause them to fly up, and as they fly scorch them with the flame of the torch. We expect to be able to clean them out pretty well by repeated efforts of that kind. After those that remain have migrated to the grapes we shall try catching them on a cloth on which is spread a coating of some sticky stuff. The torch must be worked in a sunshiny warm day, and the tar in the cool of the morning or evening,

or a cool cloudy day, because when it is warm they will fly up if disturbed, and, when on the grape vines, they will drop to the ground if disturbed when it is cool. Take a cloth and put a stick across each end, so as to keep it stretched out, and with a man at each end of the cloth put it under the vine—the cloth being well smeared with the sticky substance—and shake the vine and the hoppers will drop down onto the cloth and get stuck in the tar. This process must be done when the hoppers first appear on the vines before they are in full leaf. Afterwards the treatment may be by spraying with tobacco decoction, or something else that may be discovered to be better, and the torch may also come into use again, for, the weather now being warm, they will fly up when disturbed. We give the above simply as the means we have determined to pursue after much thought upon the subject.

Fruit is the price of eternal vigilance, and we must all do something. Out of the efforts of all the best methods will be developed. The fruit interests of this section are now very important, and are annually increasing very fast. It will never do to let these interests be ruined by insects. A campaign must be organized against them, and, if it takes more than one summer, must be fought to the bitter end.

REPORT ON THE AGRICULTURAL AND HORTICULTURAL
PRODUCTS OF COLORADO.

CHICAGO, September 30, 1889.

HON. F. J. V. SKIFF,

*Commissioner of Immigration and Statistics,
Denver, Colorado.*

I herewith submit to you my report of the agricultural and horticultural products of Colorado, now on exhibition at the Exposition Building in the city of Chicago.

Although the collection was got together from all parts of the State in a very short time and after the grain was all in stack, it makes a display that reflects great credit upon our State; but owing to the manner in which a great deal of the grain and grasses were packed, the boxes not having sufficient air, the contents molded to such an extent I am unable to designate the name of the producer or the variety. I will therefore be compelled in making this report to give only the number of varieties of grain and grasses sent from the different counties.

The agricultural display occupied a space twenty-five (25) feet wide by thirty-five (35) feet long, with a wall space ten (10) feet high, the wall space being used to display the grain in the straw and the grasses. The different varieties of grain and seeds were displayed on a large pyramid table in the center of the space. The wall space in the rear of the agricultural and manufactured department, seventy (70) feet by ten (10), was used to display the flora of the State, consisting of two hundred and four (204) varieties of flowers mounted on white card board, with blue back ground, making a very attractive and beautiful picture.

The varieties of grain and grasses are as follows:

WELD COUNTY.

17 varieties of Native Grasses, also Alfalfa, Alsike Clover,
Red Clover and Orchard Grass.

| | | |
|---|---|--------|
| 3 | " | Wheat. |
| 3 | " | Oats. |
| 2 | " | Rye. |
| 3 | " | Corn. |

LARIMER COUNTY.

75 varieties of Wheat.

| | | |
|----|---|--------------|
| 20 | " | Rye. |
| 14 | " | Oats. |
| 3 | " | Barley. |
| 2 | " | Buckwheat. |
| 3 | " | Corn. |
| 46 | " | Grass Seeds. |
| 50 | " | Beans. |

This collection includes a very fine collection from
the Agricultural College.

BOULDER COUNTY.

17 varieties of Native Grasses, also Alfalfa, Alsike Clover,
Red Clover, Orchard Grass, Gramma
Grass, Millet and Hungarian.

| | | |
|---|---|----------------|
| 7 | " | Wheat. |
| 5 | " | Oats. |
| 4 | " | Rye. |
| 5 | " | Barley. |
| 2 | " | Buckwheat. |
| | | European Flax. |
| 4 | " | Tobacco. |
| 5 | " | Corn. |
| 1 | " | Sugar Cane. |
| 1 | " | Broom Corn. |

ARAPAHOE COUNTY.

The display from this county consists of a beautiful collection from Windsor Farm of

| | | |
|---|--------------|---------|
| 8 | varieties of | Wheat. |
| 7 | " | Oats. |
| 2 | " | Millet. |
| 4 | " | Grass. |
| 2 | " | Corn. |

PUEBLO COUNTY.

| | | |
|---|--------------|-------------|
| 4 | varieties of | Wheat. |
| 4 | " | Oats. |
| 3 | " | Rye. |
| 2 | " | Corn. |
| 1 | " | Broom Corn. |
| 1 | " | Millet. |

RIO GRANDE COUNTY.

| | | |
|---|--------------|------------------|
| 3 | varieties of | Wheat. |
| 7 | " | Oats. |
| 4 | " | Barley. |
| 4 | " | Rye. |
| 1 | " | Millet. |
| 1 | " | Hungarian Grass. |
| 1 | " | Broom Corn. |
| 3 | " | Corn. |
| 1 | " | Peas. |
| 1 | " | Flax. |

The grain from this county is very fine, the oats standing eight feet in height, rye seven feet and wheat five feet in height, showing how very productive the soil is.

COSTILLO COUNTY.

The collection from this county consists of wheat, oats, rye, barley and native grasses, but owing to the very bad condition in which they reached Chicago, for reasons which have already been explained, I am unable to give the number of varieties.

CONEJOS COUNTY.

The display from this county consisted of:

| | | |
|---|--------------|-------------|
| 5 | varieties of | Wheat. |
| 6 | " | Oats. |
| 4 | " | Rye. |
| 1 | " | Buckwheat. |
| 1 | " | Flax. |
| 2 | " | Barley. |
| 1 | " | Broom Corn. |
| 1 | " | Sugar Cane. |
| 1 | " | Millet. |

There was also a fine collection of native grasses from this county.

YUMA COUNTY.

The display from this county consists of Wheat, Rye and Oats; also a small collection of Vegetables.

OTERO COUNTY.

| | | |
|----|--------------|------------|
| 6 | varieties of | Wheat. |
| 4 | " | Oats. |
| 3 | " | Rye. |
| 2 | " | Barley. |
| 1 | variety of | Buckwheat. |
| 20 | varieties of | Peas. |
| 12 | " | Beans. |

There was also a collection of Grasses from this county, composed of native and cultivated.

FREMONT COUNTY.

JESSE FRAZER, PRODUCER.

| | | | |
|-----|----|---------------------|---------|
| No. | 1. | Rambo | Apples. |
| | 2. | Golden Russet | " |
| | 3. | Russian Red | " |
| | 4. | Golden Pippin | " |
| | 5. | Sweet Romanite | " |
| | 6. | White Winter Sweet | " |
| | 7. | Huntsman's Favorite | " |
| | 8. | Walbridge | " |

FREMONT COUNTY—CONTINUED.

| | | |
|-----|-----------------------------------|---------|
| 9. | Ben Davis | Apples. |
| 10. | Jonathan | " |
| 11. | Smoke House | " |
| 12. | Tallman's Sweet | " |
| 13. | English Russet | " |
| 14. | Sweet Orange | " |
| 15. | Vandever Pippin | " |
| 16. | New York Pippin | " |
| 17. | Cooper's Market | " |
| 18. | King of Tompkins County | " |
| 19. | Grimes' Golden | " |
| 20. | Large Romanite | " |
| 21. | Tallman's Sweet | " |
| 22. | Kreswick Codling | " |
| 23. | Wealthy | " |
| 24. | Wine Sap | " |
| 25. | Missouri Pippin | " |
| 26. | Seek-No-Further | " |
| 27. | Perry Russet | " |
| 28. | Red Winter | " |
| 29. | Red Winter Pearmain | " |
| 30. | Northern Sweet | " |
| 31. | Jefferis | " |
| 32. | Willow Twig | " |
| 33. | Jo Dandy | " |
| 34. | Stripe Gilliflower | " |
| 35. | Sweet Pear | " |
| 36. | Colorado Orange | " |
| 37. | Roxbury Russet | " |
| | 12 varieties of apples not named. | |
| 38. | Seedling | Apples. |
| 39. | Sugar | Pear. |
| 40. | Sheldon | " |
| 41. | Unknown | " |
| 42. | Duchess | " |
| 43. | Seckel | " |
| 44. | Unknown | " |
| 45. | Howell | " |
| 46. | Flemish Beauty | " |
| 47. | Unknown | " |
| 48. | Seedling | Peach. |

SECRETARY'S ROUND-UP.

FREMONT COUNTY—CONTINUED.

W. B. FELTON, PRODUCER.

| | | | |
|-----|-----|------------------------|---------|
| No. | 1. | Ben Davis | Apples. |
| | 2. | Wine Sap | " |
| | 3. | Fulton | " |
| | 4. | Golden Russet | " |
| | 5. | Walbridge | " |
| | 6. | Fameuse | " |
| | 7. | Yellow Bellflower | " |
| | 8. | Limber Twig | " |
| | 9. | Camarie | " |
| | 10. | Willow Twig | " |
| | 11. | Roman Stem | " |
| | 12. | Grimes' Golden | " |
| | 13. | Barry Russet | " |
| | 14. | Baldwin | " |
| | 15. | Jeneting | " |
| | 16. | Virginia Seedling | " |
| | 17. | Jonathan | " |
| | 18. | Virginia Greening | " |
| | | 6 varieties not named. | |
| | 19. | Flemish Beauty | Pears. |
| | 20. | Orange Quince | " |
| | 21. | Sheldon | " |
| | 22. | Harvill | " |
| | | 2 varieties not named. | |
| | 23. | German Prune | Plum. |
| | 24. | Large Yellow Egg | " |

W. C. CATLIN, PRODUCER.

| | | | |
|-----|-----|---------------------|---------|
| No. | 1. | Gilliflower | Apples. |
| | 2. | Jonathan | " |
| | 3. | Red Winter Pearmin | " |
| | 4. | Haas | " |
| | 5. | Seedling not named | " |
| | 6. | Maiden's Blush | " |
| | 7. | Wine Sap | " |
| | 8. | Pewaukee | " |
| | 9. | Seedling not named. | " |
| | 10. | Romanite | " |
| | 11. | Ben Davis | " |
| | 12. | Colorado Seedling | " |
| | 13. | Jeneting | " |
| | 14. | Willow Twig | " |
| | 15. | Sweet Pear | " |

FREMONT COUNTY—CONTINUED.

- | | | |
|-----|------------------------|---------|
| 16. | Spice Sweet | Apples. |
| 17. | Seedling not named | " |
| 18. | Alexander | " |
| | 7 varieties not named. | " |
| 19. | Buerre Bon-de-Jersey | Pears. |
| 20. | Bonne-de-Jersey | " |
| 21. | Duchess Angouleme | " |

L. A. ROE, PRODUCER.

- | | | |
|--------|----------------|---------|
| No. 1. | Ben Davis | Apples. |
| 2. | Grimes' Golden | " |
| 3. | Willow Twig | " |

S. BRADLEY, PRODUCER.

- | | | |
|--------|-----------------------|---------|
| No. 1. | Haas | Apples. |
| 2. | Kentucky Red Streak | " |
| 3. | Wine Sap | " |
| 4. | Buerre Angouleme Park | Pears. |
| 5. | Barckworth Park | " |

G. R. SHAFFER, PRODUCER.

- | | | |
|--------|-----------------|--------|
| No. 1. | Vandever Pippin | Apple. |
|--------|-----------------|--------|

JOHN PEARCE, PRODUCER.

- | | | |
|--------|-------------|--------|
| No. 1. | Isham Sweet | Apple. |
|--------|-------------|--------|

E. H. BOWNER, PRODUCER.

- | | |
|--------|--------|
| No. 1. | Quince |
|--------|--------|

WILLIAM COOK, PRODUCER.

- | | | |
|--------|-------------|---------|
| No. 1. | Jonathan | Apples. |
| 2. | Willow Twig | " |
| 3. | Duchess | " |

GEO. O. BALDWIN, PRODUCER.

- | | | |
|--------|------------------------|-------|
| No. 1. | Duchess | Pear. |
| 2. | Rister | " |
| 3. | Seckel | " |
| 4. | Belle Lucretine | " |
| | 2 varieties not named. | |
| 5. | Green Gage | Plum. |
| 6. | Imperial | " |
| 7. | Blue Damson | " |

SECRETARY'S ROUND UP.

FREMONT COUNTY—CONTINUED.

A. & GEO. TOOF, PRODUCER.

| | | | |
|-----|----|-------------------------|---------|
| No. | 1. | Walbridge | Apples. |
| | 2. | Toof's Seedling | " |
| | 3. | Seedling not named. | " |
| | " | " " " | " |
| | | 12 varieties not named. | " |

THOMAS PRESCOTT, PRODUCER.

| | | | |
|-----|----|----------------|-------|
| No. | 1. | Flemish Beauty | Pear. |
| | 2. | Kieffer | " |
| | 3. | Forest Rose | Plum. |
| | 4. | Green Gage | " |
| | 5. | Monroe | " |
| | 6. | Weaver | " |
| | 7. | Yellow Egg | " |
| | 8. | Purple Egg | " |
| | 9. | Blue Egg | " |

J. H. HARRISON, PRODUCER.

| | | | |
|-----|-----|------------------------|---------|
| No. | 1. | Zoulard Crab | Apples. |
| | 2. | Rambo | " |
| | 3. | Bellflower | " |
| | 4. | Ben Davis | " |
| | 5. | Limber Twig | " |
| | 6. | Missouri Pippin | " |
| | 7. | Perry Russet | " |
| | 8. | Golden Russet | " |
| | 9. | Golden Pippin | " |
| | | 8 varieties not named. | |
| | 10. | Sheldon | Pear. |
| | | 2 varieties not named. | |

W. H. ASH, PRODUCER.

| | | | |
|-----|----|------------|---------|
| No. | 1. | Walbridge | Apples. |
| | 2. | Flora Bell | " |

L. ROBINSON, PRODUCER.

| | | | |
|-----|----|-------------------------------|-------|
| | | 3 varieties apples not named. | |
| No. | 1. | Duchess | Pear. |
| | | 2 varieties not named. | |
| | 2. | Prune | Plum. |
| | 3. | Lombard | " |
| | 4. | Green Gage | " |
| | | 2 varieties not named. | |

FREMONT COUNTY—CONTINUED.

JOHN LOCK, PRODUCER.

| | | | |
|-----|----|-------------------------------|---------|
| No. | 1. | Russian Sweet | Apples. |
| | 2. | Jonathan | " |
| | 3. | Vandever Pippin | " |
| | | Fall Rambo | " |
| | | Willow Twing | " |
| | | White Winter | " |
| | | Isham Sweet | " |
| | | Flora Bell | " |
| | | Ben Davis | " |
| | | Wine Sap | " |
| | | Cole's Quince | " |
| | | Red Pearmain | " |
| | | Grimes' Golden | " |
| | | Willow Twig | " |
| | | 4 seedling peaches not named. | |
| | | 5 seedling apples not named. | |

TRUE BLANCET, PRODUCER.

| | | | |
|-----|----|------------------------|---------|
| No. | 1. | Missouri Pippin | Apples. |
| | 2. | Ben Davis | " |
| | 3. | Fameuse | " |
| | 4. | Autumn Stripe | " |
| | 5. | Wealthy | " |
| | | 3 varieties not named. | |

GEO. E. M'RAY, PRODUCER.

| | | | |
|-----|----|----------------------------|---------|
| No. | 1. | Wealthy | Apples. |
| | 2. | Wagener | " |
| | 3. | Jonathan | " |
| | 4. | Ben Davis | " |
| | 5. | Fuller | " |
| | | Seven varieties not named. | |

EUGENE WESTON, PRODUCER.

| | | | |
|-----|----|-----------------|-------|
| No. | 1. | Pond's Seedling | Plum. |
|-----|----|-----------------|-------|

H. T. EDSON, PRODUCER.

| | | | |
|-----|----|---------------------------|---------|
| No. | 1. | Ben Davis | Apples. |
| | | Four varieties not named. | |
| | 2. | Duchess | Pear. |
| | 3. | Bartlett | " |
| | 4. | Flemish Beauty | " |
| | 5. | Keiffer | " |
| | | One variety not named. | |

SECRETARY'S ROUND-UP.

FREMONT COUNTY—CONTINUED.

B. F. ROCKAFELLOW, PRODUCER.

| | | | |
|-----|----|--------------------------|---------|
| No. | 1. | Ben Davis | Apples. |
| | 2. | Sweet Cider | " |
| | 3. | Perry Russet | " |
| | 4. | White Winter Pearmain | " |
| | 5. | Wine Sap | " |
| | 6. | Pewaukee | " |
| | 7. | Five varieties not named | " |
| | 8. | Buffum | Pears. |
| | | One variety not named | " |

D. C. GREEN, PRODUCER.

| | | | |
|-----|-----|-------------------------|---------|
| No. | 1. | Red Winter Pearmain | Apples. |
| | 2. | Fameuse | " |
| | 3. | Rawle's Janet | " |
| | 4. | Imperial Russian | " |
| | 5. | Wine Sap | " |
| | 6. | Jonathan | " |
| | 7. | Wagener | " |
| | 8. | Seedling | " |
| | 9. | Ben Davis | " |
| | 10. | Grimes' Golden | " |
| | | Two varieties not named | " |
| | 11. | Golden Beauty | Plum. |
| | 12. | Miner | " |
| | 13. | Weaver | " |

W. B. M'GEE, PRODUCER.

| | | | |
|-----|----|--------------------|-------|
| No. | 1. | Vicar of Wakefield | Pear. |
| | 2. | Duchess | " |
| | 3. | Large Yellow Egg | Plum. |
| | 4. | Not named | " |

ROBT. GARDNER, PRODUCER.

| | | | |
|-----|-----|---------------------|---------|
| No. | 1. | Northern Spy | Apples. |
| | 2. | Seek-No-Further | " |
| | 3. | Ben Davis | " |
| | 4. | Missouri Pippin | " |
| | 5. | Red Winter Pearmain | " |
| | 6. | Maiden's Blush | " |
| | 7. | Limber Twig | " |
| | 8. | Talman's Sweet | " |
| | 9. | Wagner | " |
| | 10. | Hyslop Crab | " |

FREMONT COUNTY—CONTINUED.

| | | |
|-----|------------------------|---------|
| 11. | Bellflower | Apples. |
| 12. | Willow Twig | " |
| 13. | Wine | " |
| 14. | Winesap | " |
| 15. | Louise Bonne-de-Jersey | Pear. |
| 16. | Not named. | " |
| 17. | Big Ute Plum | " |

JOHN GRAVESTOCK, PRODUCER.

| | | |
|--------|-----------------------------------|---------|
| No. 1. | Yellow Bellflower | Apples. |
| 2. | King of Tompkins Co. | " |
| 3. | Sweet June | " |
| 4. | Seedling of Rhode Island Greening | Apples. |
| 5. | Walbridge | Apples. |
| 6. | Baldwin | " |
| 7. | Missouri Pippin | " |
| 8. | Red Winter Pearmain | " |
| 9. | Ben Davis | " |
| 10. | Seedling of Rhode Island Greening | Apples. |
| 11. | Roman Beauty | Apples. |
| 12. | Grimes' Golden | " |
| 13. | Jonathan | " |
| 14. | Mount Vernon | Pear. |
| 15. | Bartlett | " |
| 16. | Pound Seedling | Plum. |
| 17. | Shropshire Damson | " |
| 18. | Imperial Egg | " |
| 19. | Lombard | " |
| 20. | Seedling | Peach. |
| 21. | Seedling | " |

J. A. McCANDLESS, PRODUCER.

| | | |
|--------|-------------------|---------|
| No. 1. | Willow Twig | Apples. |
| 2. | Johnathan | " |
| 3. | Yellow Bellflower | " |
| 4. | Flora Bell | " |
| 5. | Bailey's Sweet | " |
| 6. | Jenetting | " |
| 7. | Wine Sap | " |
| 8. | Snow | " |
| 9. | Perry Russet | " |
| 10. | Talman's Sweet | " |
| 11. | Winter Pippin | " |
| 12. | Red Romanite | " |

SECRETARY'S ROUND-UP.

FREMONT COUNTY—CONTINUED.

| | | |
|-----|-----------------------|---------|
| 13. | White Winter Pearmain | Apples. |
| 14. | Ben Davis | " |
| 15. | Rambo | " |
| 16. | Northern Spy | " |
| 17. | Not named | " |
| 18. | Sheldon | Pear. |
| 19. | Seckel | " |
| 20. | McCandless | " |
| 21. | Pound | " |
| 22. | Not named | " |
| 23. | Not named | " |

MESA COUNTY.

C. W. STEEL, PRODUCER.

| | | |
|--------|-----------|---------|
| No. 1. | Ben Davis | Apples. |
| 2. | Fameuse | " |
| 3. | Walbridge | " |

J. ROSS PENNISTON, PRODUCER.

| | | |
|--------|-------------|---------|
| No. 1. | Tulpahockin | Apples. |
| 2. | Ben Davis | " |

N. H. COFFMAN, PRODUCER.

| | | |
|--------|-------------|---------|
| No. 1. | Wealthy | Apples. |
| 2. | Tulpahockin | " |
| 3. | Ben Davis | " |
| 4. | Pewaukee | " |
| 5. | Not named | " |

A. M. OLDS, PRODUCER.

| | | |
|--------|-----------|--------|
| No. 1. | Not named | Peach. |
|--------|-----------|--------|

R. W. SHROPSHIRE, PRODUCER.

| | | |
|--------|-------------|---------|
| No. 1. | Congress | Apples. |
| 2. | Mann | " |
| 3. | Wine Sap | " |
| 4. | Ben Davis | " |
| 5. | Hyslop Crab | " |
| 6. | Not named | " |
| 7. | Not named | " |
| 8. | Duchess | Pear. |

JEFFERSON COUNTY.

DAVID BROTHERS, PRODUCER.

| | | |
|--------|-------------------|---------|
| No. 1. | Northern Spy | Apples. |
| 2. | Willow Twig | " |
| 3. | Jonathan | " |
| 4. | Autumn Strawberry | " |
| 5. | Alexander | " |
| 6. | Pewaukee | " |
| 7. | Flemish Beauty | Pear. |
| 8. | Batlett | " |
| 9. | Washington | Plum. |
| 10. | Weaver | " |
| 11. | Wild Goose | " |

MRS. COOK, PRODUCER.

Four varieties pears not named.

JACOB BROWN, PRODUCER.

| | | |
|--------|--------|--------|
| No. 1. | Lawver | Apple. |
|--------|--------|--------|

DAVID LUCE, PRODUCER.

| | | |
|--------|------------|---------|
| No. 1. | Jonathan | Apples. |
| 2. | Haas | " |
| 3. | Plum Cider | " |
| 4. | Bellflower | " |
| 5. | Wealthy | " |
| 6. | Pewaukee | " |

HARPEN DAVIS, PRODUCER.

| | | |
|--------|-----------------------|----------|
| No. 1. | Jenetting | Apples. |
| 2. | Key Port | Peaches. |
| | 2 varieties not named | " |

HENRY LEE, PRODUCER.

| | | |
|--------|------------|-------|
| No. 1. | Yellow Egg | Plums |
| 2. | Washington | " |
| 3. | Not named | " |
| 4. | Not named | " |

DAVID LEE, PRODUCER.

| | | |
|--------|-----------|---------|
| No. 1. | Ben Davis | Apples. |
| 2. | Pewaukee | " |
| 3. | Fameuse | " |

SECRETARY'S ROUND-UP.

JEFFERSON COUNTY—CONTINUED.

JOHN TOBIAS, PRODUCER.

| | | |
|--------|-------------------|---------|
| No. 1. | Yellow Bellflower | Apples. |
| 2. | Stark | " |
| 3. | Wealthy | " |
| 4. | Pewaukee | " |
| 5. | Haas | " |

MR. MCCLEVY, PRODUCER.

| | | |
|--------|----------------|---------|
| No. 1. | Quince | Apples. |
| 2. | Maiden's Blush | " |
| 3. | Tulpahockin | " |
| 4. | Golden Russet | " |
| 5. | Summer Queen | " |
| 6. | Not named | " |
| 7. | Not named | " |
| 8. | Not named | " |

BOULDER COUNTY.

M. G. SMITH, PRODUCER.

| | | |
|--------|-----------------------|---------|
| No. 1. | Ben Davis | Apples. |
| 2. | Small Romanite | " |
| 3. | New York Pippin | " |
| | 5 varieties not named | " |
| 4. | Bartlett | Pears. |
| | 4 seedling | " |
| | 5 varieties not named | " |
| 5. | Old Mexican Cling | Peach. |
| | 8 seedlings not named | " |

WM. STODDARD, PRODUCER.

| | | |
|--------|-----------|--------|
| No. 1. | Bartlett | Pear. |
| 2. | Red June | Apple. |
| 3. | Ben Davis | " |
| 4. | Fameuse | " |
| 5. | Not named | " |

GEO. HEFNER, PRODUCER.

| | | |
|--------|----------------|---------|
| No. 1. | Rock Russet | Apples. |
| 2. | Maiden's Blush | " |
| 3. | Jenette | " |
| 4. | Jonathan | " |
| 5. | Pewaukee | " |
| 6. | Not named | " |

REPORT ON THE PRODUCTS OF COLORADO. 591

BOULDER COUNTY—CONTINUED.

- | | | |
|----|---------------------|--------|
| 7. | Bartlett | Pears. |
| 8. | Flemish Beauty | " |
| | 1 variety not named | " |

JOHN W. GOSS, PRODUCER.

- | | | | |
|-----|-----|-----------------|---------|
| No. | 1. | Tallman's Sweet | Apples. |
| | 2. | Wealthy | " |
| | 3. | Haas | " |
| | 4. | Canada Black | " |
| | 5. | Ben Davis | " |
| | 6. | Walbridge | " |
| | 7. | Fall Stripe | " |
| | 8. | Roxbury Russet | " |
| | 9. | Utter's Red | " |
| | 10. | Spitzensburg | " |
| | 11. | Plum Cider | " |
| | 12. | Pewaukee | " |
| | 13. | Goss's Beauty | " |
| | 14. | Jenette | " |
| | 15. | Rambo | " |
| | 16. | Wine Sap | " |
| | 17. | Bellflower | " |
| | 18. | Large Romanite | " |

GEO. R. MCINTOSH, PRODUCER.

- | | | | |
|-----|----|-----------------------|---------|
| No. | 1. | Baldwin | Apples. |
| | 2. | Rhode Island Greening | " |
| | 3. | Pewaukee | " |
| | 4. | Plum Cider | " |
| | 5. | Bartlett | Pear. |
| | 6. | Flemish Beauty | " |
| | 7. | Not named | " |

JAMES ACKERMAN, PRODUCER.

- | | | | |
|-----|-----|----------------------|---------|
| No. | 1. | Nutall | Apples. |
| | 2. | Haas | " |
| | 3. | Zoulard Crab | " |
| | 4. | Perry Russet | " |
| | 5. | Walbridge | " |
| | 6. | Clark's Pearmain | " |
| | 7. | Limber Twig | " |
| | 8. | Flushing Spitzenburg | " |
| | 9. | Utter's Red | " |
| | 10. | Plum Cider | " |
| | 11. | Basset | " |

SECRETARY'S ROUND-UP.

BOULDER COUNTY—CONTINUED.

| | | |
|-----|-----------------------|---------|
| 12. | Pewaukee | Apples. |
| 13. | Sweet Pear | " |
| 14. | Northern Spy | " |
| 15. | Talman's Sweet. | " |
| 16. | Jonathan | " |
| 17. | Wine Sap | " |
| 18. | Nick-a-Jack | " |
| 19. | Willow Twig | " |
| 20. | White Winter Pearmain | " |
| 21. | General Grant Crab | " |
| 22. | Minnesota | " |
| 23. | Flemish Beauty | Pears. |
| 24. | Bartlett | " |
| 25. | Clapp's Favorite | " |
| 26. | St. Lawrence | " |
| 27. | Not named | " |

R. WOODBURY, PRODUCER.

| | | | |
|-----|-----|---------------|---------|
| No. | 1. | Ben Davis | Apples. |
| | 2. | Rister | " |
| | 3. | Isham Sweet | " |
| | 4. | Travis Stripe | " |
| | 5. | Not named | " |
| | 6. | Seedling | Plum. |
| | 7. | Peach | " |
| | 8. | Seedling | " |
| | 9. | Glass | " |
| | 10. | Wild Goose | " |
| | 11. | Hazard | " |

MRS. R. B. WHITE, PRODUCER.

| | | | |
|-----|-----|-----------------------|---------|
| No. | 1. | Clapp's Favorite | Pears. |
| | 2. | Flemish Beauty | " |
| | 3. | Bartlett | " |
| | 4. | Russet | " |
| | 5. | Not named | " |
| | 6. | Golden Pippin | Apples. |
| | 7. | Baldwin | " |
| | 8. | Rhode Island Greening | " |
| | 9. | Jonathan | " |
| | 10. | Pewaukee | " |
| | 11. | Rambo | " |
| | 12. | Wine Sap | " |
| | 13. | Missouri Pippin | " |

REPORT ON THE PRODUCTS OF COLORADO. 593

BOULDER COUNTY—CONTINUED.

JOHN BRIERLEY, PRODUCER.

| | | |
|--------|-------------------------|---------|
| No. 1. | Hyslop Crab | Apples. |
| 2. | Brierley Seedling No. 1 | " |
| 3. | Brierley Seedling No. 2 | " |
| 4. | Brierley Seedling No. 3 | " |

J. A. DAVIS, PRODUCER.

| | | |
|--------|------------------|--------|
| No. 1. | Prince Englebert | Plums. |
| 2. | Burgundy Prune | " |
| 3. | Weaver | " |

MR. DAVIS, PRODUCER.

| | | |
|--------|-----------|---------|
| No. 1. | Ben Davis | Apples. |
| 2. | Baldwin | " |

L. MCINTOSH, PRODUCER.

| | | |
|--------|---------------|---------|
| No. 1. | Jonathan | Apples. |
| 2. | Golden Russet | " |
| 3. | Wealthy | " |
| 4. | Haas | " |
| 5. | Grindstone | " |
| 6. | Golden Pippin | " |
| 7. | Rambo | " |
| 8. | Wine Sap | " |

GEO. WEBSTER, PRODUCER.

| | | |
|--------|-----------------------|---------|
| No. 1. | Bellflower | Apples. |
| 2. | Seek-No-Further | " |
| 3. | Huntsman's Favorite | " |
| 4. | Webster's Seedling | " |
| 5. | Peck's Pleasant | " |
| 6. | Northern Spy | " |
| 7. | Wealthy | " |
| 8. | Home Seedling | " |
| 9. | Green New Town Pippin | " |
| 10. | Golden Pippin | " |
| 11. | Longmont Seedling | " |
| 12. | New York Pippin | " |
| 13. | Jonathan | " |
| 14. | Wine Sap | " |
| 15. | Baldwin | " |
| 16. | Tallman's Sweet | " |
| 17. | Maiden's Blush | " |
| 18. | Pewaukee | " |
| 19. | Plum Cider | " |

LARIMER COUNTY.

J. S. MCCLELLAND, PRODUCER.

| | | | |
|-----|-----|--------------------------|---------|
| No. | 1. | Utter's Red | Apples. |
| | 2. | Seedling (fine) | " |
| | 3. | Plum Cider | " |
| | 4. | Ben Davis | " |
| | 5. | Porter | " |
| | 6. | Grimes' Golden | " |
| | 7. | Ben Davis, grown in 1888 | " |
| | 8. | Not named | " |
| | 9. | White Pippin | " |
| | 10. | Seedling (fine) | " |
| | 11. | Unknown | " |
| | 12. | Haas | " |
| | 13. | Denver | " |
| | 14. | Willow Twig | " |
| | 15. | Golden Russett | " |
| | 16. | Seedling (fine) | " |
| | 17. | Baldwin | " |
| | 18. | Winter Queen | " |
| | 19. | Fameuse | " |
| | 20. | Seedling | " |
| | 21. | Martha Crab | " |
| | 22. | Maiden's Blush | " |
| | 23. | Pewaukee | " |
| | 24. | Jonathan | " |
| | 25. | Walbridge | " |
| | 26. | Duchess of Oldenburg | " |
| | 27. | Wealthy | " |
| | 28. | Primate | " |
| | 29. | Talman | " |
| | 30. | Wine Sap | " |
| | 31. | Weaver | Plum. |
| | 32. | Damson | " |
| | 33. | Desota | " |
| | 34. | Green Gage | " |
| | 35. | Yellow Egg | " |

MRS. SANSBURY, PRODUCER.

| | | | |
|-----|----|-----------|--------|
| No. | 1. | Alexander | Apple. |
|-----|----|-----------|--------|

REPORT ON THE PRODUCTS OF COLORADO. 595

LARIMER COUNTY—CONTINUED.

C. RAY, PRODUCER.

| | | | |
|-----|----|---------|---------|
| No. | 1. | Wealthy | Apples. |
| | 2. | Duchess | " |
| | 3. | Wealthy | " |

HARRIS STRATTON, PRODUCER.

| | | | |
|-----|----|----------------|---------|
| No. | 1. | Martha Crab | Apples. |
| | 2. | Ben Davis | " |
| | 3. | Wealthy | " |
| | 4. | Jonathan | " |
| | 5. | Pewaukee | " |
| | 6. | Wine Sap | " |
| | 7. | Walbridge | " |
| | 8. | Maiden's Blush | " |
| | 9. | Grimes' Golden | " |

A. WILD, PRODUCER.

| | | | |
|-----|-----|-----------------|---------|
| No. | 1. | Jenette | Apples. |
| | 2. | Fall Wine | " |
| | 3. | Grimes' Golden | " |
| | 4. | Darmine | " |
| | 5. | Ben Davis | " |
| | 6. | Pennock | " |
| | 7. | Gideon | " |
| | 8. | Fameuse | " |
| | 9. | Willow Twig | " |
| | 10. | Sweet Vandever | " |
| | 11. | Jonathan | " |
| | 12. | Walbridge | " |
| | 13. | Flora Bell | " |
| | 14. | Hyslop Crab | " |
| | 15. | Hungarian Prune | - Plum |
| | 16. | Not named | " |
| | 17. | Seedling | " |

J. S. FLORA, PRODUCER.

| | | | |
|-----|----|----------------|---------|
| No. | 1. | Wine Sap | Apples. |
| | 2. | Wealthy | " |
| | 3. | Tetofsky | " |
| | 4. | Ben Davis | " |
| | 5. | Walbridge | " |
| | 6. | Siberian Crab | " |
| | 7. | Hyslop Crab | " |
| | 8. | Flemish Beauty | Pear. |

SECRETARY'S ROUND-UP.

LARIMER COUNTY—CONTINUED.

AGRICULTURAL COLLEGE, PRODUCER.

| | | | |
|-----|-----|-----------------|---------|
| No. | 1. | Pennock | Apples. |
| | 2. | Aldron | " |
| | 3. | Walbridge | " |
| | 4. | Duchess | " |
| | 5. | Queen Crab | " |
| | 6. | Ben Davis | " |
| | 7. | No. 482 | " |
| | 8. | No. 75 | " |
| | 9. | Dwarf Ben Davis | " |
| | 10. | Martha Crab | " |
| | 11. | Tallman's Sweet | " |
| | 12. | Hyslop Crab | " |
| | 13. | Zoulard Crab | " |
| | 14. | Not named | " |
| | 15. | Not named | " |
| | 16. | Green Gage | Plum. |

MRS. OSBORNE, PRODUCER.

| | | | |
|-----|----|------------|---------|
| No. | 1. | Ben Davis | Apples. |
| | 2. | Wealthy | " |
| | 3. | Jonathan | " |
| | 4. | Bellflower | " |

W. S. STROME, PRODUCER.

| | | | |
|-----|----|------------|---------|
| No. | 1. | Bellflower | Apples. |
| | 2. | Ben Davis | " |
| | 3. | Baldwin | " |

A. H. HOAG, PRODUCER.

| | | | |
|-----|-----|---------------------|---------|
| No. | 1. | Duchess | Apples. |
| | 2. | Sweet Crab | " |
| | 3. | Wine Sap | " |
| | 4. | Whitney No. 20 Crab | " |
| | 5. | Wine Sap Winter | " |
| | 6. | Walbridge | " |
| | 7. | Minnesota Crab | " |
| | 8. | Haas | " |
| | 9. | Lady | " |
| | 10. | McMahon's White | " |
| | 11. | Russian not named | " |
| | 12. | Minnesota Hybrid | " |
| | 13. | Winter Rambo | " |
| | 14. | Hyslop Crab | " |

REPORT ON THE PRODUCTS OF COLORADO. 597

LARIMER COUNTY—CONTINUED.

| | | |
|---------|------------------------------|----------|
| No. 15. | Strobe | Apples. |
| 16. | Ganno Sport of the Ben Davis | " |
| 17. | Zoulard Crab | " |
| 18. | Giddeon | " |
| 19. | Hoag | " |
| 20. | Ben Davis | " |
| 21. | Jonathan | " |
| 22. | Wealthy | " |
| 23. | 12 varieties not named | " |
| 24. | Seedling | Peaches. |
| 25. | Seedling | " |
| 26. | Not named | " |
| 27. | Flemish Beauty | Pears. |
| 28. | Bartlett | " |
| 29. | Louise Bon de Jersey | " |
| 30. | Not named | " |
| 31. | Louise Bon | " |
| 32. | Lawrence | " |
| 33. | Blue Egg | Plums. |
| 34. | Lombard | " |
| 35. | Blue Damson | " |
| 36. | Wild | " |
| 37. | Desota | " |
| 38. | Weaver | " |
| 39. | Yellow Egg | " |
| 40. | Seedling | " |
| 41. | Not named | " |

MRS. TAFT, PRODUCER.

| | | |
|--------|-----------|---------|
| No. 1. | Duchess | Apples. |
| 2. | Ben Davis | " |
| 3. | Giddeon | " |
| 4. | Jonathan | " |
| 5. | Wealthy | " |

F. W. GARRETT, PRODUCER.

| | | |
|--------|------------|---------|
| No. 1. | Fall Rambo | Apples. |
| 2. | Wealthy | " |
| 3. | Snow | " |

At the close of the Exposition the products in my department were disposed of as follows: The flora of the State, together with the mounted specimens of grains

and grasses from the Agricultural College and Windsor Farm, and all grains and seeds in bottles were returned. The grain in the straw and grasses were given to the churches and schools of Chicago, together with the vegetables. The apples were sold to Mr. Leland, of the Leland Hotel, for \$40, and the money given to the Newsboys' Home of Chicago, all of which I very respectfully submit.

[Signed]

C. S. FAUROT,
*Special Agent of the Bureau of
Immigration and Statistics.*

Note by Secretary—The following is a summary of responses to inquiries addressed to the Vice-Presidents of each county in the State. I regret that I have not received answers from all counties.

REPORTS FROM VARIOUS COUNTIES.

EDWARD S. HOUSEL, the Vice-President for Boulder county, says that the number of acres of land in that county susceptible of irrigation is seventy-five thousand one hundred and twenty-five, and that the sources of the water supply are the North and South Boulder, the Left Hand, the St. Vrain and Coal creek. Approximately there are from one thousand to twelve hundred miles of main canal lines in the county, but that it is difficult to tell how many miles of laterals there are. The water supply of all these streams is appropriated, and about twenty-five thousand acres are now irrigated. The altitude of this county is five thousand feet above the sea level. There are about four hundred and thirty-eight acres of fruit trees and about two hundred and three acres of small fruits and grapes. The soil is clay and sand, with clay subsoil. The latest killing frost in the spring of 1889 was about May —. The success of the timber culture has been good, and Cottonwood, Black

Locust, Walnut, Maple, White Ash, Elm, Lime and Box Elder are the trees grown, and very little damage has been done to the trees by reason of fire in late years. There has been excellent success in the culture of garden and field vegetables. The prospects at present are good for an abundant crop this season.

JAMES E. CHURCH, of Springfield, Baca county, reports that there are one million six hundred thousand acres all practically susceptible of irrigation except that there is no water except a few small streams which are not sufficient to cover more than a very small part of the acreage. That there are no canals or ditches as yet, and hardly more than enough water in the county to water the stock. There are one or two small ditches that irrigate perhaps a hundred acres or so, but nothing of any consequence. There could only be irrigated under the most favorable circumstances about thirty-five hundred to five thousand acres. The soil is rather a rich sandy loam, not very dark in color. As the county has only been settled about three years, trees have not been cultivated long enough to prove what can be done. A few tree claims have been planted and are doing well. There are no native forests, but on the western edge of the county there are a few Cedars and Pines. Catalpas, Mulberries and Locusts are preferred for tree claims. The fires and the cattle have prevented the Cottonwoods growing along the creeks. The ground is too new to give good results in vegetables, although there have been grown fair Potatoes, Turnips, Pumpkins, etc.

E. M. TAYLOR, of Pagosa Springs, says of Archuleta county: That there are about two hundred and fifty thousand acres of land susceptible of irrigation. The water supply may be taken from the Navajo, Blanco, San Juan, and Piedro Rivers, and from numerous small streams. There are now only about four miles of main

canals, with about thirty miles of laterals, leaving the greater portion of the water supply still unappropriated. If the water could be conserved, over four hundred thousand acres could be irrigated. The altitude is seven thousand one hundred and eighty feet above the sea. There are about ten acres of fruit trees and about five acres of small fruits. The soil is a deep black loam. In 1889, there were perhaps twenty days of zero weather, and last killing frost was May 10. The county is covered with a good quality of Yellow Pine and Cottonwood, and no tree culture has been attempted. There has been no damage by fire for five years, when the Indians set fire to the forests and burned a good deal. The culture of field and garden vegetables is first class, except corn. Oats weigh forty-five pounds to the bushel. The Utes must go, and then we will have the finest country in the State.

W. L. PATCHEN, of Cheyenne Wells, reports from Cheyenne county: There are no irrigation and no surveys ever made, but it is believed that one-half the land, or five hundred and sixty-six thousand acres can be irrigated. The sources of water supply are the Big Sandy, the Beaver north fork and the south fork of the Smoky rivers, none of which are appropriated for this purpose. We are about four thousand feet above the level of the sea. There are about ten acres of fruit trees and three acres of small fruits. The soil is a dark sandy loam. There was no zero weather here last winter and the last killing frost was March 25. When properly planted almost any kind of trees have been found to grow and are vigorous and healthy. Walnut, Locust and Cottonwood and various others might be mentioned. There are no natural forests. Garden and field vegetables have done very well considering that there is no irrigation.

E. C. VAN DIEST reports for Costilla county: There are about seven hundred and fifty thousand acres of land susceptible of irrigation and the water supply is obtained from the Rio Grande and the Culebra, Trinchera, Costilla and Sangre de Cristo creeks. There are one hundred miles of canals, including laterals, leaving about four hundred cubic feet of water unappropriated. If the water could be conserved about fifty thousand acres could be supplied. This county is seven thousand seven hundred feet above the level of the sea. There is practically no fruit grown. The soil is of a sandy loam of decomposed basalt and trachyte. There were not less than ten zero days last winter. The trees are White Pine, Yellow Pine, Spruce and Cottonwood. No particular damage has been done by fire in these forests. Garden and field vegetables have succeeded well. The soil is well adapted for any kind of vegetable and cereal that will mature before September 15. Corn and melons do not do well on account of the high altitude.

HON. SAMUEL WADE, of Paonia, makes the following report for Delta county: About one hundred and twenty thousand acres of land in this county are susceptible of irrigation. Water may be obtained from the Gunnison, North Fork and Uncompahgre rivers, Surface and Tongue creeks, with other small streams. There are about eight miles of canals and forty miles of laterals. By far the greater part of our lands are irrigated by private ditches. There is nine-tenths of the water of the Gunnison and three-fourths of the North Fork rivers unappropriated. About fifty thousand acres could be supplied if these waters were conserved. Our altitude is five thousand feet. The rain-fall was very slight last year. There is about three hundred and fifty acres of fruit trees and only twelve acres of small fruits in the county. The soil is a sandy loam with a clay

subsoil on the North Fork Valley, and sandy loam and adobe generally through the county: We had about thirty minutes of zero weather in 1889, and the last killing frost was April 1. Timber culture has been very successful when tried. White Ash, Catalpa, Speciosia, Box Elder, Columbia Poplar and all the Willow family. Forest fires have injured the trees only about one-twentieth of one per cent. All garden and field crops are very successful. The county thus far has been rid of all insects detrimental to fruit crops.

HARRY JONES, of Castle Rock, the Vice-President for Douglas county, says: Perhaps there are sixty thousand acres irrigable from all sources. Cherry and Plum creeks and their forks and tributaries and the South Platte river are the sources of water supply. There are seventeen miles of canals, and a ditch which might be called a canal will be finished this season, which will add thirty miles more. I fear the appropriation of water, at times, exceeds the supply. The soil is a sandy loam. Last winter there was not more than five or six days of zero weather. The success of tree culture has been rather limited. I do not know of a single tree claim. Our forest trees are Ash, Box Elder and Cottonwood. Probably ten per cent. of the acreage of forest trees have been denuded by fire. Garden and field vegetables grow very well. There is much successful horticulture in the county without irrigation.

F. R. LEWIS, of Rico, Dolores county, says: Horticulture will be at a discount in this county for several years to come. We have a good water supply from the Dolores and West Dolores rivers, Silver creek, Disappointment creek and others, but the amount of land irrigable has not been estimated. We are eight thousand five hundred feet above the sea, and no ditches have been built. There is no timber culture, and the natural trees

are Mountain Spruce and Quaking Aspen, and much damage has been done by fire. There is no vegetable culture in the county.

JUDGE W. B. FELTON, of Cañon City, reports for Fremont county: Of the forty thousand acres susceptible of irrigation, about twenty thousand acres are under cultivation. The State ditch just commenced will cover several thousand acres from the Arkansas river and its tributaries. There are thirty-seven miles of main canals and one hundred miles of laterals in the county. The water supply is about all appropriated. About ten or fifteen thousand acres of land could be supplied by conserving the water at command. Cañon City is five thousand two hundred and eighty feet above the sea. The rain-fall in 1889 averaged about twelve inches. There are six hundred acres of fruit trees and seventy-five acres of small fruits in this county. The soil is sandy loam and adobe. We had no zero weather in 1889. No fruits or vegetables were killed by frost last Spring, although April 30 the thermometer stood at thirty degrees. Timber culture has been successful. The forest trees are Black Walnut, Ash, Maple, Locust, and all kinds do well. Fire has done very little damage to fruit trees. The general success of garden and field vegetables has been excellent.

ED. J. JONES, of Hot Sulphur Springs, Grand county, reports that the sources of water supply are the Grand river and its tributaries, Fraser, Willow, Cassell and Williams forks, Blue and Muddy creeks, by their tributaries. The ditches are all private, so it would be hard to state what portion of the water is unemployed. If the water should be conserved all the irrigable land in the county could be used. There is no fruit. The soil is sandy. Timber culture has never been sufficiently tried to enable an estimate to be given of the results.

There have been no recent forest fires; all that has been destroyed happened years ago. Garden and field vegetables have been successful as far as tried.

D. S. HARRIS, Superintendent of Schools at Burlington, reports that about ten thousand acres of land in Kit Carson county is susceptible of irrigation. The sources of water supply are the South fork of the Republican and the Smoky rivers. There are about five miles of main canals, but no laterals. There is only a small proportion of the water appropriated. There could be one thousand acres or more supplied if the water were conserved. The altitude is about four thousand feet. The rain-fall last year was about fourteen inches. There are probably one hundred acres of fruit trees and practically no small fruits in the county. The soil is a clay loam underlined by loess. We had three or four zero days in 1889. So far the timber culture has been attended with good success, but has been tried for only two years. Box Elder, Cottonwood, Ash, Poplar, Mulberry, Black Locust and Catalpa. There are no natural forests and hence no fires. The general success of garden and field culture of vegetables has been very good. It will be necessary to first set forest trees and establish wind breaks before any fruit growing can be successful. This is being extensively done.

S. W. DE BUSK, of Trinidad, makes this report on Las Animas county: We have about thirty-two thousand acres susceptible of irrigation. Our water sources are the Las Animas river and Trinchera, San Francisco and Apishapa creeks. There are two hundred and fifty miles of main canals, but it is difficult to estimate the laterals. The longest branch is only sixteen miles long. About eighty days in the year the supply is greater than the demand, but usually the supply is all appropriated; one hundred thousand acres additional might be irri-

gated if the waters were conserved. This county lies from four to nine thousand feet above the sea. There are about fifty acres of fruit trees and about five acres of small fruits. The western third of the county is a black mold; the soil in the eastern part of the county is adobe in the valleys and clay and sandy loam on the prairies. There was no zero weather last winter and no killing frost since April 19. No timber has been grown to maturity on any considerable tract. White Ash is preferred as a forest tree, although Box Elder and Cottonwood are much used. The losses from fire have been very slight. Vegetables in garden and field have yielded excellently, yet many are still imported. In the spring of 1889 all vegetation came out two weeks earlier than usual and was killed by the April frost. A few apple trees show the dead spot in crotch of tree.

GEORGE WEAVER reports from Durango for La Plata county, he says: That there are about fifty-five thousand acres susceptible of irrigation. The water is obtained from the La Plata, Animas, Florida and Pine rivers, with tributaries. Altogether there are about sixty-five miles of canals, counting the small ditches. There is enough water not in use to irrigate La Plata and several other counties of the same size. If the water should be reservoired, at least several millions of acres could be irrigated. The altitude of the county ranges from six to fourteen thousand feet. The aggregate acreage of fruit trees is about seventy, and of small fruits thirteen acres. The soil is a sandy loam. Timber culture has never been tried and the fires have not burned any of the natural trees. Vegetable and field vegetation cannot be surpassed anywhere. This statement does not cover the Indian reservation in the county, which has more land irrigable than the rest of the county and has a climate suitable for the raising of almost any kind of fruit grown in this latitude.

The report for Larimer county is made by O. D. SHIELDS, of Fort Collins: There are one hundred and twenty-five thousand acres of irrigable land in Larimer county, with plenty of water from the Cache la Poudre, Big and Little Thompson rivers with a few tributaries. Over four hundred miles of main ditches are cut throughout the country. The water which is available is all employed, but if the water was conserved probably one hundred thousand acres in addition could be irrigated. The altitude is five thousand two hundred feet. Something like four hundred and fifty acres of fruit trees and five acres of small fruits are yielding. All kinds of soil may be found. There were ten days of zero weather in 1889. Nearly all kinds of timber has been planted and is doing well. The forest trees are Locust, Ash, Elm, Maple, Box Elder, Cottonwood, etc., and probably five hundred to one thousand acres have been destroyed by fire in the past few years. Garden and field vegetables give good results.

H. A. BILLOW, of Lamar, makes the report from Prowers county. He says that sixty-eight thousand acres are susceptible of irrigation from the Arkansas river. There will be one hundred and seventy-five miles of main canal built this season in addition to two hundred and twenty-five miles already completed. The laterals will measure five hundred and twenty-two miles, and three hundred and twenty-two miles more will be dug this year. The whole amount of land may be supplied by suitable conservation. Prowers county is four thousand feet above the sea. The rain-fall last year was 12.06 inches. There are one hundred and twenty-three acres of fruit trees and thirty acres of small fruits in the county. The soil is black loam with ashes loam subsoil. In 1889 the mercury was below zero only three times. The last killing frost was on March 22. Timber culture

has been very successful, and Cottonwood, Honey Locust, Walnut, Ash, etc., are growing finely. Fire has caused no damage to trees. Garden vegetables are growing splendidly, and oats, wheat and corn have done well. There has been a large acreage of wheat sown this spring.

Routt county is reported by C. E. BAKER, of Hahn's Peak: There are probably twelve thousand eight hundred acres of land in this county susceptible of irrigation. Water may be had from the Bear and Snake rivers and the tributaries to both. There are no canals whatever in the county. There is enough water for twice the land now under irrigation. The acreage could be increased by fifty thousand acres if the water was properly conserved. The altitude will average six thousand feet. Fruit is experimental as yet. The soil is of a deep, rich erinaceous character. We had not to exceed thirty days of zero weather last winter, and the latest hard frost was about June 1. Where the soil was properly tilled and trees watered good results have been obtained in timber culture. The native forest trees succeed the best in this county. About twenty-five per cent. of the native trees have been lost by fire. Vegetables raised here can not be beat.

L. W. THIELE, of Aspen, sends a report from Pitkin county. He says that there is plenty of water in Roaring Fork, Hunter, Castle, Maroon, Woody, Frying Pan, Snow, Mass and Sopris creeks. The altitude is seven thousand four hundred and ninety-three and sixty-seven one-hundredths feet. There were ninety days of zero weather during last winter and the last killing frost was April 15. Vegetables are raised with good success.

Rio Blanca county is reported by L. B. WALBRIDGE of Meeker. There are about one hundred and fifty thousand irrigable acres in the county with water from the White river and its tributaries. About eight

hundred miles of main canal lines are in operation with about eighty miles of laterals. About two-thirds of the water supply is still unused, which, if properly conserved, would irrigate the whole country. The altitude is six thousand one hundred feet. There is no meteorological station, so the rain-fall cannot be determined. There is no fruit to any amount and only three or four acres of small fruit. The soil is a gravelly loam. The winter of 1889 had about ten zero days and the last hard frost was in the first part of May. Timber culture has never been tried, although Cottonwood seems to thrive. About one-tenth of the native trees have been destroyed by fire. The general success of garden and field culture of vegetables has been very good.

M. W. EMERY writes in regard to San Juan county. He says the county enjoys an altitude of eleven thousand feet, and no point is less than nine thousand feet, which fact insures large bodies of snow the year around, and hard frosts are common in every month. There is not an acre of agricultural land in the county and no fruits or berries of any kind can be raised. Originally about thirty per cent. of the county was timbered with Mountain Pine, Fir and Aspen, of the quality common to the whole mountain region.

FRANK W. WILLIAMS reports on Yuma county. There are only about one thousand acres susceptible of irrigation in this county. The water is obtained from the Republican river and is carried about ten miles. There are no lateral ditches. The altitude averages four thousand and seventy-five feet. A few trees have been planted by nearly everyone, but there is no acreage to be estimated, and there has been scarcely any small fruit planted. The soil is a sandy loam. There was not much zero weather in 1889, and the last hard frost was about May 10. Where trees have been

properly planted and cultivated they have been raised successfully. The trees that do the best are Black Locust, Box Elder, Cottonwood and Ash. There are no native forests. Generally vegetables are successfully raised.

THE USE OF PARIS GREEN, ETC.

At a meeting of one of the Farmers' Institutes held near here (Rochester, N. Y.), Prof. Comstock, of Cornell University, speaking of the pests of the orchard and garden, and the use of Paris Green as a sure means of not only holding them in check, but for their entire banishment, said of this insecticide:

THE USE OF PARIS GREEN AS AN INSECTICIDE.

It is in this direction that the greatest advance has been made in the methods of fighting insects. Every farmer has long known of the use of Paris Green against the potato beetle; but this insect is only one of many pests that are now being successfully combated by this poison. Not only has the use of arsenical poisons been greatly extended, but the methods of using them have been so greatly improved that now we have no fears of bad results. The day is passed when a farmer can afford to knock the beetles off his vines into a pan with a stick. He can now use Paris Green cheaply, successfully, and without the slightest danger of injuring his crop.

Paris Green and London Purple both owe their efficiency as insecticides to the presence in them of arsenic. This has led some to try to substitute arsenic for them, as it costs only about one-fifth as much, but it is found that ordinary white arsenic cannot be safely used, as it is slightly soluble in water, and the solution has a caustic

effect on the leaves of plants. In fact the danger of scorching the leaves with arsenic is so great that its use as an insecticide has been abandoned.

It has been the practice until quite recently to use Paris Green and London Purple in much greater strength than necessary, and to this fact is attributed the bad results that have sometimes followed the use of these substances. The user of Paris Green should first make sure that he has a pure article, and then he should not use it in a greater strength than in the proportion of one pound of the poison to two hundred gallons of water.

In this connection it is desirable to know a simple test for the purity of Paris Green. The most simple one that is known is the fact that Paris Green is soluble in ammonia. Put a small quantity of this poison into a glass dish, and pour over it some liquid ammonia, at least one ounce of the liquid to one hundred grains of Paris Green. Stir the mixture with a stick or glass rod; if the Paris Green be pure, the result will be a clear green liquid. If an insoluble sediment remains in the bottom of the glass, it will indicate the presence of impurities and also their amount. Unfortunately this test will not detect an adulteration with white arsenic, as this substance is also soluble in ammonia. But I do not believe that arsenic is often if ever used as an adulterant.

Some anxiety has been felt lest the continued use of arsenical poisons on the soil might result in so poisoning the soil as to injure the growth of plants. Experiments have shown that there may be at least nine hundred pounds per acre of Paris Green in the soil before a serious effect is produced on the plants. When we take into account the fact that the poison will be leached out of the soil or enter into chemical combination with other elements, we can see that the danger from this source is infinitesimal.

Neither is there danger of the plants absorbing the poison, as has been shown by careful chemical analysis. The foliage and fruit of an apple tree which was very heavily sprayed with Paris Green early in the season were analyzed at the time the fruit was fit to pick, and not a trace of arsenic could be found. This substance is very heavy, and is consequently easily washed off by the summer rains.

The most practical way of applying Paris Green is to stir it in water and throw the mixture in the form of a fine spray upon the plants by means of a force-pump. There are now many good force-pumps upon the market. The water should be placed in a large cask or tank upon a wagon, so that it can be easily drawn through the fields of potatoes or from tree to tree in the orchards. Great care should be taken to stir the mixture thoroughly, as Paris Green is insoluble and is much heavier than water.

I repeat that in the use of this poison it is unnecessary to use a greater strength than in the proportion of one pound of Paris Green to two hundred gallons of water; and in the case of stone fruit, especially peaches, it should not be used in a larger proportion than one pound to three hundred gallons of water.

The proper time for spraying apple trees is just as the blossoms fall, and before the young fruit is heavy enough to droop. While the young apples are projecting upward, much of the liquid sprayed upon the trees will lodge in the blossom end of the fruit, and this is just where it is wanted. It is here that eggs of the Codlin Moth are laid, and the young worm is poisoned as soon as it leaves the egg, while eating its first meal.

It is now definitely proved that equally good results follow from spraying plum and peach trees in order to protect the fruit from the Curculio. In this case it is

the adult insect that is poisoned. The adult is a beetle that feeds on the foliage and fruit of our orchard trees. If the trees be sprayed just after the blossoms fall, the beetles will be poisoned before they have stung the plums or peaches. If you visit the orchards of the successful growers of these fruits during the summer, instead of finding the ground covered with stung fruit, you will find that it is necessary to thin the fruit on the trees that have been sprayed to keep them from over-bearing.

PRESERVING FRUIT FOR EXHIBIT.

The *Pacific Rural Press* is authority for the following, which any reader can try and prove for himself :

Liverpool salt dissolved in clear water until the brine is strong enough to float the fruit. Let this stand over night, and then strain through a cloth until the liquid is perfectly clear. Place the fruit to be preserved in thoroughly clean, wide-mouthed jars; fill to the brim with the brine, and then close tightly. While this method will for a long time perfectly preserve the bloom and color of the fruit, it of course unfits it for eating. Twigs, with the foliage attached, when preserved in this way, are exceedingly attractive for exhibition purposes.

APIARY PRODUCTS.

BY J. M. CLARK, Secretary State Bee-Keepers' Association.

The honey crop for 1889 was larger by about one hundred thousand pounds than for 1888.

The estimate, made from reports handed in and the number not yet reported, place the total product at about three hundred thousand pounds. This includes both comb and extracted honey.

The per cent. of increase has been larger and the average yield per hive has increased about ten per cent. The very low yield in El Paso, Bent, Las Animas and Fremont counties reduce the average very much. Foul brood exists in Arapahoe, Jefferson and Douglas counties, and appears to be spreading southward, but making no progress northward. A careful observance of the law passed by the last Legislature would keep the disease under control and eventually eradicate it, as it is more easily controlled in our dry climate than in a damp atmosphere. The development of this industry is gratifying, and the product will soon have to seek a market outside of the State, as we shall produce more than we can consume.

The quality of the honey the past season has been excellent, and it has been put on the market in finer shape than ever before. At the State Fair in Indiana, Colorado took *first* premium.

The following table shows the result of the reports thus far received:

APIARY PRODUCTS

| COUNTIES. | Spring Count. | Increase. | Fall Count. | Lbs Comb Honey. | Extracted Honey, lbs. | Average lbs. per Hive. | Percentage of Increase in Swarms | Total No. of Pounds. |
|----------------------|---------------|-----------|-------------|-----------------|-----------------------|------------------------|----------------------------------|----------------------|
| Arapahoe | 558 | 499 | 986 | 35,675 | 4,655 | 72½ | 89½ | 40,330 |
| Jefferson | 570 | 535 | 998 | 33,243 | 4,930 | 67 | 93½ | 38,173 |
| Weld | 409 | 390 | 762 | 22,158 | 10,000 | 78½ | 95 | 32,158 |
| Larimer | 282 | 291 | 529 | 16,170 | 4,830 | 74½ | 103 | 21,000 |
| Boulder | 241 | 291 | 492 | 13,740 | 500 | 59 | 120¼ | 14,240 |
| Delta | 73 | 151 | 205 | 6,313 | 400 | 92 | 206 | 6,713 |
| Montrose | 66 | 102 | 160 | 6,600 | 67 | 101 | 154½ | 6,667 |
| Douglas | 14 | 30 | 56 | 2,200 | 157 | 157 | 214 | 2,200 |
| El Paso | 46 | 19 | 61 | 695 | 710 | 30½ | 41 | 1,405 |
| Bent | 11 | 11 | 18 | 125 | 125 | 11¼ | 100 | 125 |
| Las Animas | 4 | 6 | 10 | 50 | 12 | 12 | 150 | 50 |
| Fremont | 58 | 35 | 91 | 990 | 17 | 17 | 60¼ | 990 |
| Total | 2,332 | 2,360 | 4,368 | 137,834 | 26,217 | 63 | 119 | 164,051 |

Of about four hundred bee-keepers in the State only one hundred and twenty have reported.

Estimated total production for 1889, three hundred thousand pounds.

METEOROLOGICAL RECORD.

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THE CLIMATE OF COLORADO.

METEOROLOGICAL MONTHLY RECORD AND YEARLY AVERAGES.

By Sergeant J. J. Gilligan. Compiled from 19 years' Signal Service observations.

NOTE—The following meteorological tables is the work of a careful, painstaking gentleman who has been in charge of the signal station at the city of Denver for six years, and a member of the signal bureau since its organization. The meteorological student can rely on these tables as being scrupulously correct, and their study will give the horticulturist a correct statement of the climate of Colorado, as indicated at Denver City.—SECRETARY.

MAXIMUM TEMPERATURE.

| YEAR. | Jan. | Feb. | Mar. | Apr. | May | June | July. | Aug. | Sept. | Oct. | Nov. | Dec. |
|-------|------|------|------|------|------|------|-------|-------|-------|------|------|------|
| 1872. | 56.0 | | | 80 | 91 | 92 | 95 | 95 | 88 | 85 | 66 | 59.0 |
| 1873. | 62.0 | 60.0 | 75.0 | 81.0 | 84.0 | 99.0 | 99.0 | 96.0 | 90.0 | 86.0 | 71.0 | 59. |
| 1874. | 62.0 | 60.0 | 62.0 | 83.0 | 92.0 | 98.5 | 102.3 | 96.5 | 92.0 | 83.2 | 72.0 | 71.0 |
| 1875. | 56.0 | 64.0 | 73.0 | 80.0 | 87.0 | 97.0 | 95.0 | 96.0 | 91.0 | 84.0 | 75.0 | 66. |
| 1876. | 59.0 | 66.0 | 70.0 | 82.0 | 85.0 | 97.0 | 101.0 | 100.0 | 90.0 | 85.0 | 76.0 | 68. |
| 1877. | 58.0 | 60.0 | 75 | 72 | 85.0 | 95 | 99 | 99 | 92 | 85 | 67 | 64 |
| 1878. | 55.0 | 61.0 | 76.0 | 80.0 | 87.0 | 93.0 | 100.0 | 105.0 | 93.0 | 83.0 | 73.0 | 62.0 |
| 1879. | 61.0 | 72.0 | 81.0 | 76.0 | 90.0 | 95.0 | 98.0 | 95.0 | 89.0 | 84.0 | 76.0 | 66.0 |
| 1880. | 63.0 | 59.0 | 73 | 77 | 89 | 96 | 95 | 93 | 89 | 79 | 61 | 61 |
| 1881. | 63.0 | 60.5 | 69.0 | 80.0 | 83.8 | 95.0 | 99.0 | 95.8 | 88.0 | 81.7 | 66.0 | 67.0 |
| 1882. | 67.0 | 61.0 | 71.0 | 76.0 | 78.0 | 88.2 | 91.3 | 94.0 | 89.0 | 76.0 | 65.0 | 64.0 |
| 1883. | 61.0 | 56.0 | 70.0 | 73.0 | 79.2 | 91.0 | 95.5 | 91.0 | 87.7 | 75.2 | 73.2 | 62.0 |
| 1884. | 59.0 | 61.3 | 61.1 | 70.3 | 80.5 | 90.2 | 96.5 | 92.2 | 87.8 | 80.3 | 69.8 | 68.2 |
| 1885. | 64.0 | 60.4 | 68.3 | 71.2 | 86.0 | 86.2 | 97.3 | 92.8 | 80.6 | 80.1 | 75.0 | 74.1 |
| 1886. | 62.8 | 71.0 | 68.0 | 74.6 | 89.9 | 92.7 | 96.3 | 94.3 | 85.7 | 77.0 | 63.0 | 64.8 |
| 1887. | 66.9 | 70.9 | 74.7 | 82.5 | 89.4 | 95.9 | 92.1 | 94.6 | 87.6 | 85.1 | 73.7 | 66.6 |
| 1888. | 76.0 | 70.5 | 70.0 | 80.6 | 80.5 | 97.7 | 100.3 | 92.4 | 90.0 | 79.8 | 70.2 | 67.5 |
| 1889. | 56.0 | 61.0 | 70.0 | 78.0 | 83.0 | 92.0 | 100.0 | 98.0 | 94.0 | 85.0 | 60.0 | 66.0 |

MINIMUM TEMPERATURE.

| YEAR. | Jan. | Feb. | Mar. | Apr. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. |
|-------|-------|-------|-------|------|------|-------|-------|------|-------|------|-------|-------|
| 1872. | -22 | -4 | 0 | 19 | 27 | 43 | 45 | | | | | 8 |
| 1873. | -17 | 30 | 11.0 | 10.0 | 27.0 | 42.0 | 42.0 | 50.0 | 28.0 | 1.0 | 1.0 | 5.0 |
| 1874. | -7.0 | -11.0 | 12.0 | 14.0 | 29.0 | 40.0 | 51.0 | 51.2 | 34.6 | 13.2 | 8.0 | -5.0 |
| 1875. | -29.0 | 3.0 | 1.0 | 9.0 | 35.0 | 38.0 | 53.0 | 50.0 | 32.0 | 27.0 | 5.0 | -3.0 |
| 1876. | -2.0 | 7.0 | 3.0 | 4.0 | 32.0 | 38.0 | 43.0 | 44.0 | 32.0 | 24.0 | 3.0 | -25.0 |
| 1877. | -15 | 16 | 0 | 12 | 32 | 39 | 48 | 47 | 37 | 22 | -18 | 5 |
| 1878. | -12.0 | 15.0 | 21.0 | 25.0 | 32.0 | 43.0 | 54.0 | 54.0 | 34.0 | 10.0 | 11.0 | -12.0 |
| 1879. | -10.0 | -3.0 | 17.0 | 28.0 | 37.0 | 43.0 | 52.0 | 50.0 | 38.0 | 20.0 | 11.0 | -17.0 |
| 1880. | -6 | | -10 | 20 | 32 | 39 | 54 | 50 | 35 | 26 | -13.5 | -11 |
| 1881. | -12.0 | -20.0 | 8.0 | 18.0 | 34.6 | 48.9 | 57.0 | 53.1 | 37.0 | 28.0 | 10.5 | 18.0 |
| 1882. | 1.2 | 10.5 | 10.0 | 21.0 | 34.0 | 43.0 | 49.0 | 47.0 | 38.8 | 27.3 | -4.0 | -2.0 |
| 1883. | -20.0 | -22.0 | 18.0 | 22.0 | 31.5 | 37.0 | 52.0 | 50.0 | 40.5 | 25.0 | 23.4 | 2.0 |
| 1884. | -2.0 | -15.0 | 10.9 | 22.5 | 28.0 | 48.0 | 52.0 | 51.0 | 40.0 | 26.0 | 13.2 | -8.0 |
| 1885. | -10.9 | 0.2 | 5.4 | 17.6 | 27.1 | 41.0 | 50.3 | 46.4 | 42.5 | 21.9 | 11.2 | -5.6 |
| 1886. | -18.9 | 2.9 | -10.7 | 20.5 | 35.5 | 46.8 | 55.5 | 48.5 | 29.0 | 22.6 | -6.0 | -1.4 |
| 1887. | -17.6 | -2.6 | 13.2 | 20.5 | 30.9 | 43.7 | 50.0 | 46.9 | 35.0 | 7.8 | -14.2 | -13.6 |
| 1888. | -20.3 | 15.5 | -1.5 | 30.0 | 31.5 | 41.0 | 51.4 | 49.2 | 38.0 | 26.0 | 11.5 | 7.2 |
| 1889. | 3.5 | -7.0 | 18.0 | 29.0 | 32.0 | 37.0 | 50.0 | 46.0 | 30.0 | 25.0 | 3.0 | 4.0 |

Dash (—) denotes below zero.

AVERAGE TEMPERATURE.

| YEAR. | Jan. | Feb. | Mar. | Apr. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. |
|-------|------|------|------|------|------|-------|-------|------|-------|------|------|------|
| 1872 | 24 | 33 | 36 | 45 | 57 | 66 | 68 | 69 | 60 | 50 | 34 | 28 |
| 1873 | 30 | 31 | 44 | 38 | 53 | 68 | 71 | 70 | 60 | 46 | 41 | 23 |
| 1874 | 32 | 26 | 30 | 43 | 61 | 69 | 75 | 77 | 59 | 53 | 52 | 30 |
| 1875 | 17 | 32 | 33 | 44 | 59 | 69 | 68 | 69 | 61 | 54 | 38 | 38 |
| 1876 | 28 | 38 | 35 | 49 | 56 | 66 | 74 | 70 | 62 | 55 | 38 | 28 |
| 1877 | 25 | 35 | 43 | 44 | 56 | 64 | 73 | 72 | 58 | 46 | 35 | 33 |
| 1878 | 27 | 36 | 46 | 49 | 54 | 63 | 73 | 72 | 62 | 50 | 42 | 23 |
| 1879 | 24 | 36 | 46 | 50 | 61 | 68 | 74 | 69 | 61 | 48 | 38 | 29 |
| 1880 | 36 | 28 | 34 | 47 | 57 | 67 | 79 | 69 | 61 | 48 | 22 | 30 |
| 1881 | 26 | 30 | 38 | 52 | 59 | 71 | 75 | 73 | 60 | 50 | 36 | 59 |
| 1882 | 30 | 38 | 43 | 47 | 52 | 65 | 71 | 72 | 63 | 50 | 37 | 35 |
| 1883 | 28 | 22 | 44 | 46 | 54 | 65 | 71 | 62 | 62 | 47 | 43 | 32 |
| 1884 | 32 | 30 | 39 | 44 | 54 | 67 | 74 | 68 | 65 | 46 | 42 | 25 |
| 1885 | 29 | 32 | 38 | 46 | 53 | 64 | 70 | 68 | 62 | 49 | 43 | 36 |
| 1886 | 21 | 39 | 34 | 44 | 61 | 65 | 74 | 71 | 60 | 52 | 33 | 37 |
| 1887 | 31 | 32 | 46 | 49 | 60 | 69 | 69 | 68 | 63 | 48 | 40 | 29 |
| 1888 | 27 | 39 | 33 | 53 | 53 | 68 | 71 | 65 | 61 | 48 | 34 | 34 |
| 1889 | 27 | 30 | 43 | 51 | 56 | 64 | 72 | 73 | 60 | 52 | 32 | 40 |

MONTHLY MEAN RELATIVE HUMIDITY.

| YEAR. | Jan. | Feb. | Mar. | Apr. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. |
|-------|------|------|------|------|------|-------|-------|------|-------|------|------|------|
| 1872 | 63 | 56 | 61 | 48 | 56 | 51 | 54 | 52 | 51 | 42 | 47 | 54 |
| 1873 | 45 | 44 | 29 | 53 | 52 | 41 | 45 | 49 | 43 | 50 | 42 | 59 |
| 1874 | 51 | 61 | 59 | 54 | 42 | 43 | 42 | 45 | 44 | 54 | 42 | 56 |
| 1875 | 56 | 47 | 49 | 47 | 40 | 29 | 55 | 47 | 52 | 32 | 57 | 45 |
| 1876 | 42 | 40 | 52 | 39 | 45 | 38 | 40 | 45 | 43 | 34 | 47 | 52 |
| 1877 | 62 | 63 | 48 | 54 | 46 | 39 | 34 | 37 | 38 | 52 | 52 | 55 |
| 1878 | 54 | 48 | 43 | 34 | 50 | 51 | 49 | 51 | 45 | 30 | 43 | 53 |
| 1879 | 54 | 58 | 46 | 60 | 41 | 40 | 47 | 43 | 35 | 33 | 50 | 60 |
| 1880 | 41 | 51 | 42 | 39 | 38 | 39 | 49 | 48 | 46 | 57 | 66 | 64 |
| 1881 | 60 | 58 | 57 | 48 | 55 | 35 | 47 | 54 | 44 | 49 | 60 | 51 |
| 1882 | 57 | 48 | 40 | 49 | 59 | 58 | 47 | 53 | 39 | 47 | 51 | 44 |
| 1883 | 56 | 64 | 53 | 57 | 57 | 53 | 50 | 49 | 48 | 56 | 46 | 61 |
| 1884 | 54 | 57 | 56 | 57 | 58 | 53 | 43 | 53 | 41 | 49 | 47 | 63 |
| 1885 | 57 | 64 | 57 | 62 | 59 | 51 | 54 | 57 | 54 | 55 | 56 | 57 |
| 1886 | 67 | 52 | 65 | 67 | 31 | 55 | 48 | 56 | 53 | 50 | 61 | 53 |
| 1887 | 54 | 51 | 43 | 47 | 47 | 44 | 53 | 55 | 60 | 56 | 53 | 52 |
| 1888 | 54 | 53 | 55 | 41 | 56 | 38 | 45 | 51 | 46 | 51 | 62 | 50 |
| 1889 | 66 | 56 | 49 | 50 | 56 | 52 | 50 | 50 | 44 | 53 | 68 | 56 |

METEOROLOGICAL RECORD.

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TOTAL, PRECIPITATION.

| YEAR. | Jan. | Feb. | Mar. | Apr. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. |
|-------|------|------|------|------|------|-------|-------|------|-------|------|------|------|
| 1872 | 0.55 | 0.22 | 1.71 | 2.09 | 3.74 | 2.07 | 2.69 | 1.75 | 1.57 | 0.68 | 0.69 | 0.29 |
| 1873 | 0.13 | 0.24 | 0.22 | 2.43 | 0.75 | 2.24 | 2.00 | 1.41 | 0.89 | 0.73 | 0.16 | 0.61 |
| 1874 | 0.84 | 0.53 | 0.49 | 1.70 | 2.43 | 1.21 | 3.35 | 0.68 | 1.34 | 0.64 | 0.08 | 0.17 |
| 1875 | 0.38 | 0.60 | 0.39 | 2.24 | 1.94 | 0.43 | 4.32 | 1.97 | 2.89 | 0.22 | 1.28 | 0.59 |
| 1876 | 0.21 | 0.11 | 1.86 | 1.22 | 8.57 | 1.10 | 1.16 | 2.03 | 0.60 | 0.12 | 1.50 | 1.70 |
| 1877 | 1.90 | 0.40 | 1.40 | 2.77 | 2.30 | 1.93 | 0.33 | 1.30 | 0.38 | 2.15 | 0.73 | 0.79 |
| 1878 | 0.10 | 0.48 | 1.82 | 0.05 | 2.90 | 2.78 | 1.28 | 2.25 | 1.23 | 0.80 | 0.67 | 1.05 |
| 1879 | 0.40 | 0.39 | 1.00 | 2.62 | 3.36 | 0.32 | 0.64 | 1.38 | 0.02 | 0.19 | 0.21 | 0.33 |
| 1880 | 0.38 | 0.32 | 0.21 | 0.31 | 1.11 | 1.22 | 1.38 | 1.46 | 0.89 | 1.37 | 0.83 | 0.10 |
| 1881 | 0.49 | 1.22 | 0.87 | 0.50 | 2.21 | 0.09 | 2.50 | 2.33 | 0.57 | 0.32 | 1.68 | 0.00 |
| 1882 | 0.57 | 0.20 | 0.20 | 1.47 | 2.98 | 4.06 | 0.66 | 1.20 | 0.06 | 0.75 | 0.71 | 0.73 |
| 1883 | 2.35 | 0.45 | 0.21 | 3.10 | 4.30 | 0.85 | 2.27 | 0.75 | 1.08 | 1.49 | 0.32 | 2.32 |
| 1884 | 0.22 | 0.86 | 0.93 | 3.33 | 4.61 | 1.47 | 0.65 | 1.71 | 0.13 | 1.21 | 0.19 | 0.76 |
| 1885 | 0.41 | 0.75 | 0.97 | 4.94 | 2.13 | 0.66 | 1.33 | 1.18 | 1.22 | 0.73 | 0.55 | 1.08 |
| 1886 | 0.62 | 0.72 | 2.36 | 2.79 | 0.09 | 2.26 | 0.50 | 1.62 | 0.98 | 0.33 | 1.93 | 0.87 |
| 1887 | 0.67 | 0.30 | 0.23 | 2.16 | 1.13 | 0.53 | 2.49 | 2.68 | 0.97 | 0.97 | 0.22 | 0.14 |
| 1888 | 0.11 | 0.37 | 1.15 | 1.71 | 2.66 | 0.29 | 0.41 | 1.51 | 0.11 | 0.77 | 0.33 | 0.09 |
| 1889 | 0.50 | 0.70 | 0.40 | 1.34 | 3.44 | 1.88 | 2.94 | 0.33 | 0.28 | 2.11 | 0.53 | 0.30 |

WEATHER.

| NO. OF DAYS | | | | NO. OF DAYS | | | | NO. OF DAYS | | | | NO. OF DAYS | | | | NO. OF DAYS | | | |
|-------------|-------|------|-------|-------------|------|-------|------|-------------|----|------|-------|-------------|-------|----|-------------|-------------|------|-------|----|
| JAN. | Clear | Fair | Cl'dy | ° | PER. | Clear | Fair | Cl'dy | ° | MCH. | Clear | Fair | Cl'dy | ° | NO. OF DAYS | Clear | Fair | Cl'dy | ° |
| 1872 | 13 | 14 | 4 | 4 | 1872 | 7 | 19 | 3 | 6 | 1872 | 16 | 10 | 5 | 10 | 1872 | 9 | 12 | 9 | 8 |
| 1873 | 12 | 13 | 3 | 3 | 1873 | 12 | 13 | 3 | 3 | 1873 | 16 | 10 | 5 | 4 | 1873 | 9 | 12 | 9 | 8 |
| 1874 | 12 | 13 | 3 | 3 | 1874 | 11 | 10 | 7 | 5 | 1874 | 16 | 10 | 5 | 4 | 1874 | 10 | 14 | 6 | 8 |
| 1875 | 10 | 15 | 6 | 3 | 1875 | 12 | 12 | 4 | 3 | 1875 | 15 | 11 | 5 | 6 | 1875 | 10 | 14 | 6 | 8 |
| 1876 | 23 | 7 | 1 | 2 | 1876 | 17 | 12 | 0 | 5 | 1876 | 12 | 9 | 10 | 11 | 1876 | 11 | 14 | 6 | 8 |
| 1877 | 16 | 12 | 3 | 7 | 1877 | 15 | 7 | 6 | 4 | 1877 | 12 | 10 | 9 | 8 | 1877 | 11 | 14 | 6 | 8 |
| 1878 | 21 | 9 | 1 | 1 | 1878 | 11 | 10 | 6 | 6 | 1878 | 9 | 12 | 10 | 8 | 1878 | 10 | 13 | 7 | 10 |
| 1879 | 4 | 8 | 2 | 4 | 1879 | 10 | 16 | 2 | 2 | 1879 | 9 | 12 | 10 | 8 | 1879 | 10 | 13 | 7 | 10 |
| 1880 | 19 | 10 | 2 | 5 | 1880 | 14 | 12 | 3 | 6 | 1880 | 17 | 12 | 2 | 3 | 1880 | 10 | 13 | 7 | 10 |
| 1881 | 9 | 15 | 7 | 5 | 1881 | 8 | 13 | 7 | 7 | 1881 | 9 | 14 | 8 | 3 | 1881 | 10 | 13 | 7 | 10 |
| 1882 | 20 | 10 | 1 | 6 | 1882 | 17 | 10 | 1 | 3 | 1882 | 21 | 7 | 3 | 2 | 1882 | 12 | 13 | 5 | 6 |
| 1883 | 15 | 11 | 5 | 7 | 1883 | 22 | 6 | 0 | 2 | 1883 | 18 | 9 | 4 | 4 | 1883 | 8 | 9 | 13 | 13 |
| 1884 | 18 | 11 | 2 | 5 | 1884 | 16 | 11 | 2 | 8 | 1884 | 13 | 15 | 3 | 7 | 1884 | 6 | 19 | 5 | 13 |
| 1885 | 15 | 11 | 5 | 3 | 1885 | 11 | 15 | 2 | 9 | 1885 | 14 | 13 | 3 | 8 | 1885 | 7 | 13 | 10 | 13 |
| 1886 | 14 | 15 | 2 | 8 | 1886 | 11 | 12 | 5 | 4 | 1886 | 11 | 16 | 4 | 11 | 1886 | 5 | 12 | 13 | 16 |
| 1887 | 12 | 19 | 0 | 8 | 1887 | 18 | 9 | 1 | 5 | 1887 | 10 | 18 | 3 | 4 | 1887 | 8 | 14 | 8 | 10 |
| 1888 | 21 | 7 | 3 | 4 | 1888 | 13 | 9 | 7 | 5 | 1888 | 13 | 10 | 8 | 11 | 1888 | 14 | 12 | 4 | 5 |
| 1889 | 14 | 11 | 6 | 3 | 1889 | 4 | 9 | 15 | 6 | 1889 | 3 | 25 | 3 | 4 | 1889 | 4 | 16 | 10 | 10 |
| JULY | | | | AUG. | | | | SEP. | | | | OCT. | | | | NOV. | | | |
| 1872 | 12 | 14 | 5 | 9 | 1872 | 8 | 15 | 8 | 11 | 1872 | 21 | 6 | 3 | 7 | 1872 | 22 | 6 | 3 | 2 |
| 1873 | 13 | 13 | 5 | 3 | 1873 | 10 | 18 | 3 | 4 | 1873 | 16 | 11 | 3 | 4 | 1873 | 16 | 12 | 3 | 4 |
| 1874 | 10 | 14 | 7 | 16 | 1874 | 7 | 15 | 9 | 11 | 1874 | 18 | 7 | 5 | 8 | 1874 | 14 | 12 | 3 | 4 |
| 1875 | 3 | 17 | 11 | 12 | 1875 | 13 | 12 | 9 | 15 | 1875 | 9 | 9 | 12 | 13 | 1875 | 14 | 11 | 5 | 6 |
| 1876 | 15 | 13 | 3 | 3 | 1876 | 13 | 12 | 7 | 9 | 1876 | 12 | 15 | 5 | 5 | 1876 | 14 | 11 | 5 | 6 |
| 1877 | 10 | 12 | 3 | 3 | 1877 | 9 | 20 | 8 | 12 | 1877 | 18 | 7 | 4 | 5 | 1877 | 10 | 16 | 5 | 8 |
| 1878 | 11 | 17 | 3 | 12 | 1878 | 13 | 11 | 6 | 10 | 1878 | 18 | 7 | 5 | 8 | 1878 | 10 | 16 | 5 | 8 |
| 1879 | 11 | 17 | 3 | 12 | 1879 | 13 | 11 | 6 | 10 | 1879 | 25 | 5 | 0 | 2 | 1879 | 14 | 10 | 2 | 4 |
| 1880 | 12 | 15 | 4 | 5 | 1880 | 15 | 13 | 3 | 16 | 1880 | 13 | 11 | 6 | 2 | 1880 | 14 | 10 | 2 | 4 |
| 1881 | 16 | 14 | 2 | 9 | 1881 | 12 | 8 | 3 | 16 | 1881 | 23 | 4 | 1 | 3 | 1881 | 19 | 6 | 5 | 11 |
| 1882 | 18 | 12 | 1 | 7 | 1882 | 20 | 8 | 3 | 8 | 1882 | 23 | 6 | 1 | 3 | 1882 | 19 | 6 | 5 | 11 |
| 1883 | 13 | 10 | 6 | 12 | 1883 | 16 | 15 | 0 | 5 | 1883 | 16 | 13 | 3 | 7 | 1883 | 23 | 12 | 0 | 4 |
| 1884 | 8 | 21 | 3 | 12 | 1884 | 9 | 19 | 3 | 13 | 1884 | 16 | 12 | 0 | 3 | 1884 | 20 | 9 | 8 | 3 |
| 1885 | 9 | 19 | 3 | 13 | 1885 | 12 | 14 | 5 | 13 | 1885 | 16 | 14 | 1 | 5 | 1885 | 20 | 9 | 8 | 3 |
| 1886 | 16 | 11 | 4 | 5 | 1886 | 11 | 18 | 2 | 10 | 1886 | 18 | 11 | 3 | 9 | 1886 | 15 | 11 | 4 | 5 |
| 1887 | 10 | 17 | 4 | 9 | 1887 | 11 | 10 | 2 | 8 | 1887 | 18 | 13 | 1 | 9 | 1887 | 16 | 13 | 2 | 4 |
| 1888 | 7 | 22 | 2 | 10 | 1888 | 7 | 19 | 5 | 6 | 1888 | 23 | 3 | 9 | 9 | 1888 | 17 | 9 | 4 | 5 |
| 1889 | 6 | 19 | 6 | 10 | 1889 | 6 | 21 | 4 | 6 | 1889 | 9 | 18 | 3 | 6 | 1889 | 16 | 12 | 3 | 4 |

*Of Precipitation or more.

METEOROLOGICAL RECORD.

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MONTHLY MEAN CLOUDINESS.

| YEAR. | Jan. | Feb. | Mch. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|--------|------|------|------|------|-----|------|------|------|-------|------|------|------|
| 1872.. | 1.5 | 1.7 | 2.0 | 1.9 | 2.1 | 1.7 | 1.9 | 2.2 | 1.2 | 0.8 | 1.3 | 1.7 |
| 1873.. | 1.7 | 1.5 | 1.4 | 2.0 | 2.3 | 1.6 | 1.5 | 1.7 | 1.3 | 1.4 | 1.1 | 1.3 |
| 1874.. | 1.6 | 1.6 | 2.1 | 2.2 | 2.4 | 1.4 | 2.0 | 2.3 | 1.3 | 1.6 | 1.5 | 1.1 |
| 1875.. | 1.7 | 1.5 | 1.5 | 1.0 | 2.0 | 1.4 | 2.6 | 2.3 | 2.3 | 1.6 | 1.9 | 1.0 |
| 1876.. | 0.9 | 1.2 | 2.0 | 1.8 | 2.0 | 1.6 | 1.5 | 1.5 | 1.7 | 1.8 | 1.4 | 1.0 |
| 1877.. | 1.4 | 1.5 | 2.2 | 2.2 | 2.0 | 1.5 | 1.4 | 1.7 | 1.3 | 2.0 | 1.6 | 1.3 |
| 1878.. | 2.0 | 5.0 | 5.0 | 5.0 | 5.0 | 4.0 | 4.0 | 4.0 | 3.0 | 2.0 | 4.0 | 3.0 |
| 1879.. | 2.6 | 3.6 | 3.8 | 4.8 | 3.1 | 3.0 | 4.4 | 4.0 | 1.2 | 2.2 | 2.8 | 3.3 |
| 1880.. | 2.3 | 2.8 | 2.7 | 3.7 | 3.9 | 3.2 | 3.5 | 3.2 | 3.6 | 4.0 | 4.1 | 3.8 |
| 1881.. | 1.8 | 1.9 | 1.7 | 1.9 | 1.9 | 1.2 | 3.0 | 4.0 | 2.0 | 3.0 | 3.0 | 2.0 |
| 1882.. | 1.9 | 2.3 | 2.5 | 4.9 | 5.7 | 4.2 | 2.5 | 2.4 | 1.6 | 2.7 | 1.8 | 2.7 |
| 1883.. | 3.5 | 1.3 | 3.1 | 5.5 | 5.3 | 2.4 | 4.0 | 2.7 | 2.9 | 3.7 | 2.1 | 3.1 |
| 1884.. | 2.8 | 2.8 | 4.0 | 5.0 | 5.2 | 5.1 | 4.3 | 4.4 | 2.5 | 3.7 | 2.3 | 4.2 |
| 1885.. | 3.7 | 4.3 | 3.3 | 5.8 | 5.6 | 4.4 | 4.4 | 4.2 | 3.2 | 3.0 | 3.9 | 3.4 |
| 1886.. | 3.5 | 3.8 | 4.5 | 6.3 | 3.2 | 4.0 | 3.7 | 4.2 | 2.7 | 3.1 | 3.3 | 2.8 |
| 1887.. | 3.3 | 2.6 | 4.2 | 5.2 | 4.2 | 4.0 | 4.4 | 4.5 | 3.8 | 3.9 | 2.9 | 3.2 |
| 1888.. | 2.6 | 4.0 | 4.4 | 4.0 | 5.6 | 3.3 | 4.1 | 4.6 | 2.2 | 4.6 | 4.2 | 2.6 |
| 1889.. | 3.2 | 4.3 | 4.6 | 5.8 | 6.6 | 4.6 | 4.7 | 5.3 | 3.9 | 4.6 | 4.1 | 4.8 |

SECRETARY'S ROUND-UP.

AVERAGE DAILY WIND--MAXIMUM VELOCITY AND PREVAILING DIRECTION.

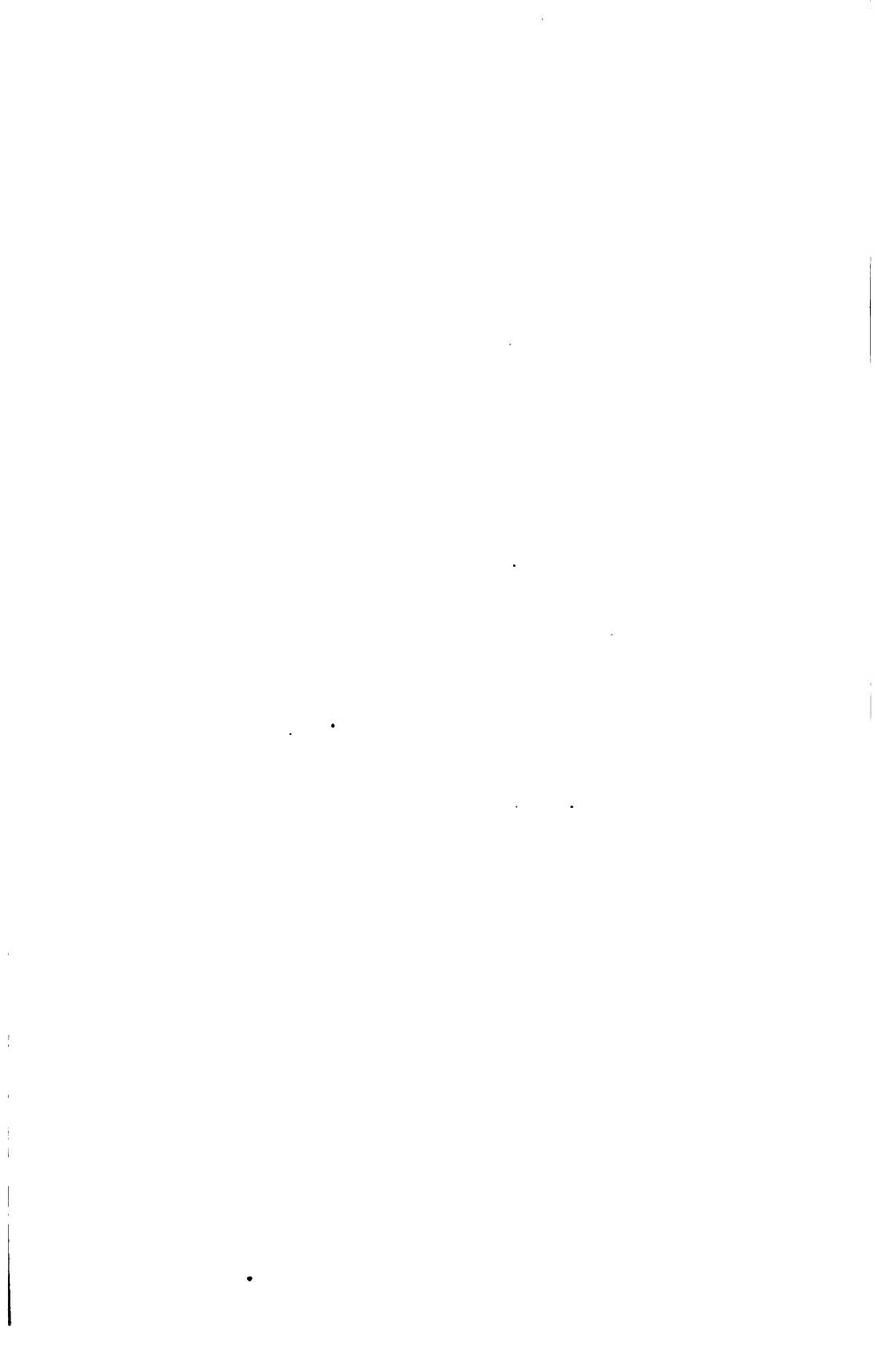
| YEAR | January | | | February | | | March | | | April | | | May | | | June | | | July | | | August | | | September | | | October | | | Nov'mbr | | | Dec'mbr | | | Annual | | | | | | | |
|------|---------|-----|------|----------|-----|------|-------|-----|------|-------|-----|------|------|-----|------|------|-----|------|------|-----|------|--------|-----|------|-----------|-----|------|---------|-----|------|---------|-----|------|---------|---|-----|--------|-----|---|-----|---|-----|----|-----|
| | Dit. | Av. | Max. | Dit. | Av. | Max. | Dit. | Av. | Max. | Dit. | Av. | Max. | Dit. | Av. | Max. | Dit. | Av. | Max. | Dit. | Av. | Max. | Dit. | Av. | Max. | Dit. | Av. | Max. | Dit. | Av. | Max. | Dit. | Av. | Max. | | | | | | | | | | | |
| 1872 | S | 119 | S | 159 | S | 164 | S | 209 | S | 125 | S | 127 | N | 107 | S | 105 | S | 101 | S | 96 | S | 120 | S | 87 | S | 126 | S | 124 | S | 122 | S | 101 | S | 105 | S | 101 | S | 96 | S | 120 | S | 87 | S | 126 |
| 1873 | n w | 152 | S | 127 | S | 171 | S | 159 | S | 121 | S | 140 | S | 136 | S | 122 | S | 200 | S | 124 | S | 144 | S | 98 | S | 134 | S | 124 | S | 122 | S | 200 | S | 124 | S | 144 | S | 98 | S | 134 | S | 134 | 56 | |
| 1874 | S | 148 | S | 102 | N E | 137 | S | 140 | S | 199 | S | 167 | S | 159 | S | 140 | S | 138 | S | 169 | S | 179 | S | 120 | S | 141 | S | 126 | S | 126 | S | 138 | S | 169 | S | 179 | S | 120 | S | 141 | S | 141 | 44 | |
| 1875 | S | 134 | S | 118 | S | 148 | S | 171 | S | 162 | S | 155 | S | 134 | S | 140 | S | 126 | S | 126 | S | 146 | S | 130 | S | 143 | S | 126 | S | 126 | S | 134 | S | 126 | S | 146 | S | 130 | S | 143 | S | 143 | 44 | |
| 1876 | sw | 109 | S | 146 | S | 188 | S | 169 | S | 168 | S | 146 | S | 133 | S | 133 | S | 114 | S | 126 | S | 160 | S | 141 | S | 150 | S | 126 | S | 126 | S | 133 | S | 114 | S | 126 | S | 160 | S | 141 | S | 150 | 75 | |
| 1877 | S | 153 | S | 107 | S | 187 | S | 174 | S | 146 | S | 140 | S | 152 | S | 149 | S | 156 | S | 128 | S | 148 | S | 138 | S | 157 | S | 128 | S | 128 | S | 156 | S | 128 | S | 148 | S | 138 | S | 157 | S | 157 | 55 | |
| 1878 | S | 162 | S | 165 | S | 210 | S | 214 | S | 192 | S | 148 | S | 152 | S | 148 | S | 140 | S | 148 | S | 156 | S | 163 | S | 171 | S | 128 | S | 128 | S | 156 | S | 128 | S | 148 | S | 163 | S | 171 | S | 171 | 60 | |
| 1879 | S | 177 | S | 186 | S | 192 | S | 195 | S | 150 | S | 162 | S | 156 | S | 159 | S | 159 | S | 148 | S | 170 | S | 160 | S | 171 | S | 128 | S | 128 | S | 156 | S | 128 | S | 148 | S | 160 | S | 171 | S | 171 | 60 | |
| 1880 | S | 204 | S | 170 | S | 150 | S | 173 | S | 165 | S | 147 | S | 130 | S | 112 | S | 107 | S | 128 | S | 126 | S | 120 | S | 141 | S | 128 | S | 128 | S | 156 | S | 128 | S | 148 | S | 163 | S | 171 | S | 171 | 60 | |
| 1881 | S | 161 | S | 121 | S | 151 | S | 154 | S | 184 | S | 180 | S | 178 | S | 136 | S | 140 | S | 130 | S | 153 | S | 120 | S | 154 | S | 128 | S | 128 | S | 156 | S | 128 | S | 148 | S | 163 | S | 171 | S | 171 | 60 | |
| 1882 | S | 164 | S | 120 | S | 138 | S | 151 | S | 181 | S | 130 | S | 159 | S | 143 | S | 140 | S | 130 | S | 153 | S | 120 | S | 154 | S | 128 | S | 128 | S | 156 | S | 128 | S | 148 | S | 163 | S | 171 | S | 171 | 60 | |
| 1883 | S | 159 | S | 89 | S | 231 | S | 151 | S | 158 | S | 120 | S | 159 | S | 143 | S | 140 | S | 130 | S | 153 | S | 120 | S | 154 | S | 128 | S | 128 | S | 156 | S | 128 | S | 148 | S | 163 | S | 171 | S | 171 | 60 | |
| 1884 | S | 182 | S | 134 | S | 185 | S | 161 | S | 160 | S | 176 | S | 164 | S | 144 | S | 152 | S | 132 | S | 172 | S | 161 | S | 156 | S | 128 | S | 128 | S | 1 | | | | | | | | | | | | |
| 1885 | S | 193 | S | 218 | S | 179 | S | 172 | S | 162 | S | 191 | S | 146 | S | 136 | S | 153 | S | 136 | S | 172 | S | 161 | S | 156 | S | 128 | S | 128 | S | 1 | | | | | | | | | | | | |
| 1886 | S | 187 | S | 241 | S | 193 | S | 209 | S | 181 | S | 166 | S | 165 | S | 132 | S | 159 | S | 136 | S | 172 | S | 161 | S | 156 | S | 128 | S | 128 | S | 1 | | | | | | | | | | | | |
| 1887 | S | 263 | S | 209 | S | 195 | S | 225 | S | 183 | S | 192 | S | 162 | S | 136 | S | 159 | S | 136 | S | 172 | S | 161 | S | 156 | S | 128 | S | 128 | S | 1 | | | | | | | | | | | | |
| 1888 | S | 190 | S | 154 | S | 136 | S | 190 | S | 166 | S | 192 | S | 161 | S | 136 | S | 159 | S | 136 | S | 172 | S | 161 | S | 156 | S | 128 | S | 128 | S | 1 | | | | | | | | | | | | |
| 1889 | S | 154 | S | 168 | S | 160 | S | 193 | S | 149 | S | 127 | S | 147 | S | 134 | S | 149 | S | 136 | S | 172 | S | 161 | S | 156 | S | 128 | S | 128 | S | 1 | | | | | | | | | | | | |

DAYS ON WHICH THE SUN WAS NOT VISIBLE IN DENVER, FROM
JULY 20, 1872.

From Observations by the late F. J. B. CRANE, Denver.*

| | | | |
|------------------------|------|---------------------------------------|------|
| January 31 | 1873 | November | 1878 |
| April 5 | 1873 | April 13 | 1879 |
| December 2 | 1873 | May 30 | 1879 |
| March 30 | 1874 | October 30 | 1879 |
| April 6 | 1874 | From October 30, 1879, to February 5, | |
| April 15 | 1874 | 1881, fifteen months, the sun was not | |
| September 2 | 1874 | obscured all of one day. | |
| November 17 | 1874 | February 5 | 1881 |
| April 24 | 1875 | September 5 | 1881 |
| September 20 | 1875 | October 4 | 1881 |
| March 31 | 1876 | December 9 | 1881 |
| May 22 | 1876 | May 6 | 1882 |
| June 28 | 1876 | August 29 | 1882 |
| February 25 | 1877 | December 5 | 1883 |
| April 26 | 1877 | February 26 | 1884 |
| October 13 | 1877 | April 18 | 1884 |
| October 14 | 1877 | February 22 | 1885 |
| October 25 | 1878 | | |

*Mr. Crane, a confirmed asthmatic, came to Denver from Detroit, Michigan, about the year 1871, and was wholly cured of the distressing malady. In 1872, for his own satisfaction, he began a compilation of a daily record of the sunshine and continued it systematically until his death in 1886, with the result stated above. It is simple, accurate and comprehensive; in short, a faithful and easily understood compendium of our climate.



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